Telephony

October 5, 1935

Come to the National Convention— It's Important to YOU!

FIRE INSURANCE CREDIT to rural telephone subscribers, Social Security Act, rural electrification, accounting and depreciation, new-business campaigns, and present economic status of country are among the topics for discussion on the program of the annual convention of the United States Independent Telephone Association in Chicago next week. Independent Pioneers' luncheon and entertainment

FOR THE FIRST TIME since 1931 the annual convention of the United States Independent Telephone Association will be held in October. The depression years caused changes in the convention customs of both national and state associations and the return to the October dates by the United States association for its annual convention undoubtedly will be welcomed by a large attendance—probably the largest in a number of years.

The annual convention of the Independent telephone industry will be held next week at The Stevens Hotel, Chicago, beginning Tuesday, October 8, and ending Friday, October 11. There are more matters of real importance to come before the meeting this year than have been considered by the annual conventions for many past years. These will be discussed by capable men and possible paths of action pointed out.

The reports of the association's officers will indicate the many changes and problems that have been faced in the past year. These will be presented at the first session on Tuesday afternoon and will indicate the activities which the association faces in the future.

SINCE the convention in July, 1934, the Federal Communications Commission has been organized and has begun to function. Its relations to the Independent industry will be explained and discussed. The order on accounting system, which was issued during the past summer, and depreciation will be among the special topics taken up. The tariff filing requirements and the annual report requirements of the commission are likewise scheduled for round-table discussion.

The Stevens

Other important matters brought about by the activities of Congress during the past year include the Social Security Act and rural electrification. These two will eventually affect practically all telephone companies. The probable manner in which the companies will be affected will be pointed out in the discussions and the important features analyzed.

ROUND-TABLE discussions at the final session on Friday morning will relate to new-business campaigns with particular attention to the rural subscriber problems. These discussions undoubtedly will develop much information of practical value to all companies, which can be adapted for use during the coming months.

The matters of commissions on tolls, teletype contracts and telegraph agencies comprise subjects that have been discussed informally at state association conventions and district meetings. The discussions next week at the Friday morning session, undoubtedly, will be full of interest to many convention delegates.

FIRE INSURANCE credit to rural telephone subscribers is another matter of great interest to all companies. This is a subject which has long been before the industry with but little progress being reported until several months ago. Prior to the convention, the special committee of the United States Independent Telephone Association handling this matter will meet for organization and development of methods for carrying out the plan agreed to by the representatives of the association and the fire insurance interests (TELEPHONY of August 10).

The convention, therefore, will be given the very latest information on this matter and will be prepared to take action for effectively placing the plan in operation.

The addresses of Dr. David Friday, of Washington, D. C., at various conventions in the past few years have been most interesting and instructive. At the Wednesday morning

session, next week, Dr. Friday will address the convention on "Where Are We Now?" speaking on the financial and economic condition of the country. Undoubtedly he will be heard by a very large audience.

DURING the past few years the various state telephone associations have effectively assisted the national association in advising and otherwise cooperating with the authorities in Washington on the various problems of the industry brought up by activities of the different bureaus, administrations and the FCC.

At the annual conference of the state association executives, to be held Wednesday afternoon, free discussions will ensue of the national problems as they relate to the member companies.

During the convention 11 directors are to be elected to fill a vacancy created by the death of Geo. X. Cannon, of Freeport, Ill., and to replace or reinstate directors whose terms are expiring. These are the directors whose terms are now concluding:

J. H. Agee, Lincoln, Neb., vice-president and general manager, Lincoln Telephone & Telegraph Co.; W. L. Cook, Chicago, Ill., president, Reliable Electric Co.; B. L. Fisher, Martinsville, Va., president, Lee Telephone Co.; J. F. Hayden, High Point, N. C., president, North State Telephone Co.; F. B. MacKinnon, Chicago, Ill., president, United States Independent Telephone Association; J. L. Mathews, Statesboro, Ga., president, Statesboro Telephone Co.

Houck McHenry, Jefferson City, Mo., president, Capital City Telephone Co.; H. A. Oberdorf, Columbia, Pa., general manager, Columbia Telephone Co.; Louis Pitcher, Dixon, Ill., general manager, Dixon Home Telephone Co., and J. W. Walton, Broken Bow, Okla., manager, Oklahoma Telephone Co.

THE FOREGOING discusses only the high spots of the program for the convention sessions. There are always last-minute changes due to the inability of a speaker to be present or the appearance on the program of some prominent man whose name was not announced owing to uncertainty of attendance.

The real details of the program, including the names of all expected to discuss the variety of topics, will undoubtedly reveal the entire convention program to be the most interesting of recent years to the average telephone man.

Although TELEPHONY has presented and reviewed, during the past year, all of the many problems which have come before the industry, it could not, of course, supply the interesting sidelights that come from a free discussion of the subjects. It is these opinions and sidelights that the many telephone men are anxious to obtain at first hand. And indications are that the attendance at the convention will be unusually large.

EXHIBITORS AT CONVENTION

American Automatic Electric Sales Co.
Bartlett Mfg. Co.
Bell Lumber & Pole Co.
Chance Co.
Coffey System & Audit Co.
Coffing Hoist Co.
Cook Electric Co.
Crescent Tool Co.
Cuneo Press, Inc.
Davey Tree Expert Co.
R. R. Donnelley & Sons Co.
Electric Products Co.
Electric Storage Battery Co.
Gustav Hirsch Corp.
Holtzer-Cabot Electric Co.
Inland Equipment Co.
J. K. Johnston
James R. Kearney Corp.
John A. Roebling's Sons Co.
Kellogg Switchboard & Supply Co.
L. M. Berry & Co.
Le Carbone Co., Inc.
Leich Electric Co.
Lenz Electric Mfg. Co.
National Carbon Co.
Naugle Pole & Tie Co.
North Electric Mfg. Co.
Page & Hill Co.
Philco Radio & Television Corp.
Postal Telegraph & Cable Co.
Ray-O-Vac Co.
Reliable Electric Co.
Runzel Cord & Wire Co.
Signaphone Corp. of America.
Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y.
Suttle Equipment Co.
Telephonads
Telephone Engineer.
The Telephone Repair Shop.
TELEPHONY
U. S. L. Battery Corp.
Whithall Tatum Co.
Wisconsin Cuneo Press

WHILE BUSINESS has been slack in the Independent manufacturing branch during the past five years, it has shown quite an improvement during the past few months. In this period of business inactivity, the manufacturers have been engaged in improving their products and developing new ones.

There has been an unsually heavy demand for exhibit rooms and by the time the convention opens it is expected that all the exhibit rooms, set aside on the 25th floor of the southern end of the hotel, will have been reserved by the manufacturers.

The list of exhibitors up to Wednesday morning, October 2, is given on this page. It contains the names of 42 firms, a number of which have never before exhibited at a national convention. Others have not been represented for several years.

The exhibits of so many different firms interested in the telephone business afford an opportunity for the operating telephone man to become familiar with all the late developments in equipment, materials and supplies, and services used in the telephone field. It is an opportunity such as has not been afforded the operating field for many years, and full advantage should be taken of it.

THE INDEPENDENT Pioneer Telephone Association, as has been its custom in past years, will hold its annual business meeting on Thursday morning. At this time the reports will be presented and officers elected. At noon, commencing at 1 o'clock, October 10, the Independent Pioneers will again be hosts at one of their enjoyable luncheons and entertainments.

This is the first luncheon and entertainment which the association has sponsored since the annual convention of the Independent industry in 1931. The entertainment committee has been diligently at work during the past several weeks and has made arrangements for a group of entertainers to be supplied by the National Broadcasting Co., which it believes will provide amusement of such variety as to appeal to everyone.

While no announcement has been made as to particular features, the reputation of the committee in furnishing entertainment of a high class standard is such that the mere announcement of the entertainment will guarantee another successful event.

All of the program—published in detail on page 36 of TELEPHONY of September 28—and activities scheduled for the annual convention of the Independent industry, indicate the progress the industry is making towards climbing out of the depression. Attendance at this meeting will be well worth while for anyone because of the great variety of information presented that will help shape company policies and programs.

OUR POOR RELATIONS

By A. H. McCONNELL
Commercial Superintendent,
Interstate Telephone Co., Spokane, Wash.

TELEPHONE employes should be endowed with a spirit of helpfulness and a desire to be of service to humanity. Educate the public to be in sympathy with our problems in rendering good service, thus forestalling antagonism and rate agitation. Address before recent Washington state telephone convention

DID YOU ever notice how the advance of science and industry has changed some of our long-established ideas and exploded asserted truths that had long been regarded almost as axioms? For instance, we have all been told many times that we are responsible for our friends but not for our relations. Even now many people would not question that statement. (Poor relations have long been considered liabilities.)

And yet I am going to make so bold as to take issue with the sage who so definitely fixed our responsibilities. I maintain we are also responsible for our relations—at least our public relations.

Did it ever occur to any of you as to just when that expression, "Public Relations," was coined? A generation ago it was not in common use. It seems to have forced itself into the picture about the same time that state regulation became an important factor in the operation of public utility companies. Certainly it does not seem to have been given much attention by the late James Hill in his heyday as a railroad magnate.

But when once launched, it seems to have swept the country like a Kansas cyclone or an epidemic of three-day measles.

A few years ago every well-organized utility company had a public relations department. It was perhaps the most highly organized in the institution and its members more temperamental than grand opera stars. If some matter of policy were involved, if a right-of-way were to be procured, if a franchise hung in the balance or the rates were questioned, the matter was referred to this 'fixit' group.

If the situation seemed to warrant the highest type of finesse, the reigning prince sallied forth to pour the most refined grade of oil upon the troubled waters. But if only a windmill were to be overcome, one of the lesser Dons was assigned to the task, with strict instructions to use the method prescribed in section XIII, paragraph (C).

Today in a well-organized telephone company, every member of the organization should be selected, partly at least, by reason of his love for humanity. Not because he has schooled himself to say the right thing at the right time, but because he has a natural sympathy with and understanding of the rights of others and is tolerant of their opinions even though they may differ from his.

There is no way of placing a value upon a pleasing personality. It may be a natural gift, and yet it is a quality that can be cultivated. I do not mean that our employes should be "yes" men. Far from it. Instead they should be actuated by a spirit of helpfulness and a desire to be of service. After all, politeness and good manners are based on kindness. But don't over-do it. Kindness should not become condescension, and a desire to be of service should not make one officious.

Forget Mistakes Of Yesterday

Never mind what has been. Remember that every morning begins a new day—a day for fresh endeavor, a day that may and should be filled with hope and gladness.

Don't add to your blunders by condemning yourself too harshly for your errors and shortcomings. Better folks than you have made worse mistakes and bigger failures. Forgive yourself as fully and freely as you would forgive another, and go cheerily on, leaving the shadows of regret behind.—MARYLAND TROOPER.

They should be students of human nature and their attitude should depend upon the reaction of the personalities with which they come in contact. Their manner should be natural and spontaneous — not the canned variety.

Let me say that misunderstanding, or at least a failure to understand each other's problems and points of view, is at the bottom of most of our troubles. Our customers are frank. They tell us, sometimes very pointedly, of their troubles and offer their criticisms. But do we always try as hard as we should to see things from their angle?

People are no longer satisfied with the explanation "that is our rule" or "that is our filed rate." The man who passes the buck to the regulatory bodies not only does not know his business but lacks faith in his organization. He should show a disposition to cooperate with them, not to blame them for conditions that are questioned.

If the public does not understand our problems and is not in sympathy with our position, it is because we have not taken the trouble to inform them. We know that the soap-box orator is busy, but we have regarded him as beneath our notice. Meanwhile, unscrupulous politicians have not been slow to grasp the situation and to capitalize it. It is a situation that lends itself to sensational development and flamboyant display.

The silence of the companies is regarded as an admission of the charges, so we stand convicted, and even sentenced, because we have seen fit to waive a hearing in our own behalf.

This "telling the public" cannot be done by campaigns during which we furnish speakers at the chamber of commerce meetings or prizes to the Boy Scouts. It must be just a natural and friendly response on the part of our members and our employes to the equally natural questions that arise in the minds of our friends—and others who might not be so classified.

We spend a lot of money in general advertising calculated to placate some individual, firm or organization, but what of the general public? What of the man who thinks the rates are too high, or the woman who resents a service connection charge? Do your full-page ads or your Christmas greetings explain these things

or make the complainants any better satisfied with conditions?

Have you talked with the man who thinks you made more money during the depression than you ever did because you didn't have enough work to keep both plant men at a certain exchange? Or the one who thought exchange rates should be reduced because the loss of stations saved the expense of one or two operators? Explain what it costs per station to furnish the service and the items and elements involved.

There is also the service line customer who thinks his service should be regarded as a by-product and is a valuable asset to keep the operators from getting out of practice.

Dealing with Subscriber Who Complains

What do you do with these people? Do you pass them up as pests and get rid of them as quickly as possible and feel you have pulled a clever stunt if you can interest them in a discussion of the weather? Or do you sit down and, with care and patience, try to tell these seekers after truth something about your problems?

They are not just making complaints, even though they often sound that way. It is because they do not understand our position and the things that confront us that they are sometimes out of sympathy with our methods and our objectives.

Do you ever call your employes together and take them into your confidence? Do you make sure that they are prepared to meet and explain the problems of their company and that they have sufficient interest in its welfare to want to do so? I find that many of us, especially those who have grown up in the industry, have accepted many of the customs and practices as self-evident without questioning the reasons for them and if called upon to explain them, might find it difficult to do so.

Group meetings are helpful at which frequently asked questions are brought up and individuals are asked to explain them. They are educational and bring out many ideas that are useful to others in disseminating information. Attending the regular meetings of the chamber of commerce and the weekly Rotary luncheons is not regarded as a reason or justification for arbitrary stands by you or your employes.

We are engaged in serving the public and the more our customers know about our problems and the difficulties we encounter in furnishing that service, the more sympathetic they will be of the things that vex us and the more tolerant of the slips and lapses that must necessarily come occasionally in our operations.

You have all no doubt noticed that when an announcement is made in a newspaper of a reduction in rates, it invariably culminates the story with something like this: "resulting in a saving to the rate payers of (a large sum of money)—many thousands of dollars."

Have you ever analyzed this for Mr. Average Citizen? Show him that, admitting the figures to be correct, this may mean a reduction of perhaps 25 cents a month to the individual, while the figure really represents that much actual loss to the company, with no corresponding reduction in the expense of operation. Explain to him that the company was not making excessive profits before (what telephone company is?) and that this loss of revenue is a serious obstacle to proper maintenance and operation.

Last fall one of our local managers reported that a rate agitation was imminent in his territory. A local business man had been in the office and remarked about the number of people in the town who were not receiving telephone service. He suggested some movement that might be sponsored by the local commercial organization.

A cry for help went in to the general office and a representative went out and called on this "agitator." He was found to be an outstanding, progressive business man, genuinely friendly and really wanting telephone development for his own convenience and because he realized its value.

He suggested a reduction in rates as an inducement to win customers. It was pointed out that a reduction of 25 cents per month would not be a deciding factor in the sale of service and that if it were, it could not be given there without including the other exchanges throughout the territory. That this reduction on 20,000 telephones would mean a loss of $5,000 a month or $60,000 a year. He saw the point at once.

Result of Applying Practical Methods

The result was we made a good and sincere friend of this man because he understood. At Christmas time he ordered telephones installed for five of his employes. This brought Christmas joy to us as well as to the recipients of his favor.

I venture to say there is no one present who has not heard that rates are too high and that they were made so in order that the utility might pay dividends on "watered stock." Have you taken the trouble to explain to these people that the rates bear no relation to the capital stock, but are based entirely upon the value of the physical property used and useful in the company's service to the public?

Have you told them that this value is not fixed arbitrarily by the company but is arrived at by a careful inventory made by the regulatory body of the state; that the unit prices used are those in use in actual transactions?

Public Understanding of Troubles Essential

It is true there are radicals in every walk of life—people who do not want to understand and who will not be convinced. But the majority of the people want to be fair. They are sympathetic of other people's troubles, even though they may be those of a utility company, *if they understand them.*

This understanding can only be brought about by a friendly and painstaking discussion of our mutual problems; not by a high-powered public relations man who knows all the answers and discusses them in technical terms, but by the people with whom they have their everyday dealings and in simple language.

The responsibility, therefore, rests with the executives and those who occupy managerial positions to discuss the company's problems with the force. Acquaint them with the solution of these problems so that they can pass this information along to the customers. Make them so interested that they will be willing and anxious to dispel these clouds of misunderstanding. It is the only way to get rid of your poor and troublesome relations.

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Movie Star Perfects Her English; Uses Telephone

Want to perfect your English? Use the telephone, advises Luise Rainer, Viennese stage star, who had to perfect her own English for her role with William Powell in "Escapade."

Coming from Vienna for her first American film, Miss Ranier had to learn English to make a bid for Hollywood fame. After intensive lessons she practiced calling friends on the telephone.

"That way," she recently explained, "I had no gestures or expressions to guide me—I had to know the words. It's like learning to swim by jumping off the pier."

Now for the CONVENTION!

Significant Matters Before It

NEXT TUESDAY, October 8, at 2 o'clock in the afternoon, the 1935 convention of the United States Independent Telephone Association will be called to order in the Tower Room on the 28th floor of the Stevens Hotel in Chicago. It is doubtful if any national telephone convention held in the past has faced such a variety of important questions, new and old, affecting the telephone industry.

This is the first national meeting of telephone people since the Federal Communications Commissions has been fully organized and functioning. The activities of this new Federal commission have raised several perplexing issues affecting Independent telephone companies.

ON SEPTEMBER 18 the commission issued its own interpretation of its jurisdiction over Independent telephone companies under section 2-(b)-(2) of the Communications Act of 1934. This interpretation affects many Independent companies. If companies so affected are actually fully subject to the jurisdiction of the FCC, the situation with respect to their regulation is in numerous cases radically changed from what they considered it to be.

The new accounting system for Class A and Class B telephone companies, as promulgated by the Federal Communications Commission, becomes effective January 1, 1936, for all companies of these classes fully subject to the jurisdiction of the FCC. This new system of accounts is a radical departure from present telephone accounting, since it requires that property values be stated on the books of the telephone company at their original cost.

These are important matters. They must, of course, have the serious consideration of the forthcoming convention. Along with them are various auxiliary matters arising from orders of the Federal commission, such as filing of tariffs, requirements for annual reports, and so on.

THERE ARE OTHER new and important questions the coming convention must consider; the new Federal Social Security Act, for instance, which affects practically all Independent telephone companies and also their employes.

The project of rural electrification needs full discussion. As recently pointed out in TELEPHONY, the construction of rural electric lines without regard for existing rural telephone lines may seriously disrupt farm telephone service in many localities.

A special committee of the United States Independent Telephone Association has in hand the question of fire insurance credits to rural telephone subscribers. Considerable progress has been made in this matter, on a basis and plan that is new. The convention will, of course, take cognizance of the movement, which is developing into one of importance to the telephone industry.

THE MANY NEW angles to many old subjects—depreciation, taxes, toll commissions and the like—are due for discussion by the national convention this year. Changing conditions have materially altered the aspects and significance of some of these questions. They must all be brought up to date.

For the first time in a number of years, the exhibitors will be back in full force at a national convention. This is as it should be—the depression is waning; telephone men are looking toward the future now. Improvements in equipment and the development of the art are more than merely academic news to operating companies now.

The successful convention must be both a school and a forum. It is a meeting to which the people of an industry go both to state their own opinions and to learn the opinions of others. Practically all progress begins with an idea, and ideas come principally from knowledge. The opportunity to meet, exchange views, learn, and decide upon a basis of the knowledge thus obtained, is valuable both to an industry and to the people engaged in it. The indications are that the forthcoming national telephone convention will be the best-attended in years.

THE OFFICERS, directors and executive committee of the United States Independent Telephone Association are entitled to the appreciation and thanks of the Independent telephone industry for their able attention to the affairs of the industry during the past year. It is no exaggeration to say that their work has been unusually valuable to Independent telephony during the past twelve months.

The national convention of the Independent telephone industry this year must consider and pass upon matters of more than usual import to the industry. Every Independent telephone company interested in these matters—and practically all of them are—should be ably represented at the meeting. It is only by such broad and able representation of the entire industry that these questions can be given the full consideration to which they are entitled and which they must have to be settled to the best advantage of all concerned.

Telephone Transmitters and Receivers

By ARTHUR L. ALBERT

Associate Professor of Communication Engineering, Oregon State College

ARTICLE THIRTEEN, in this series on fundamental principles of electricity for the telephone worker, classifies the many different types of transmitters and receivers and explains the electrical principle of operation of each group

TRANSMITTERS and receivers are, of course, very important devices. The success of the entire telephone system depends upon the proper functioning of these pieces of equipment. Many different types of transmitters and receivers have been developed and used commercially. This article will classify these and will explain the electrical principle of operation of each group. No attempt will be made to discuss the separate types which are manufactured and used in modern systems. Many of these differ in detail only.

Types of Transmitters: Transmitters can be grouped into two classes: first, *passive* transmitters; and second, *active* transmitters. In the first type, the transmitter changes some of the mechanical energy of the sound waves into electrical energy. This is in reality a *generator*, since the diaphragm is driven by mechanical forces and an electrical output results.

The second type *modifies* an electric current. With this transmitter the electrical power supplied to the telephone line comes from some local source such as a battery. The transmitter acts like a control valve, the sound waves which strike the diaphragm merely controlling the power output from the battery. The electrical output of the modifier transmitter may be many times greater than the energy present in the sound waves which strike the diaphragm.

The Magnetic Transmitter: The magnetic transmitter is of the passive type of transmitter, and as previously defined, there is no source of electrical energy (such as a battery) connected to this transmitter. It acts like a generator and takes mechanical energy from the sound waves, which it then converts into electrical energy to be impressed on the line.

Tests have shown that the power output from the human voice when speaking in the average conversational tone is about 10 microwatts, or 10/1,000,000 watt. The efficiency of a passive or generator-type transmitter is very poor. It follows, therefore, that the power output of this device must be low. Bell's original telephone transmitter was of this type.

A simple form of the magnetic transmitter is shown in Fig. 1. It consists essentially of a permanent magnet on which are welded two soft-iron pole pieces. Coils are placed on these two pole pieces and connected as shown. Magnetic lines of force from the north pole pass through the soft-iron pole piece, across the air gap, through the soft-iron diaphragm, across the air gap opposite the south pole, through the soft-iron pole piece, and around through the permanent magnet. Magnetic lines of force thus thread through the coil on each pole piece.

When sound waves strike the diaphragm, it vibrates, thus varying the magnetic path of the lines of force. This changes the flux linking the coils, and a voltage is induced in the coils. This voltage varies in accordance with the speech sounds.

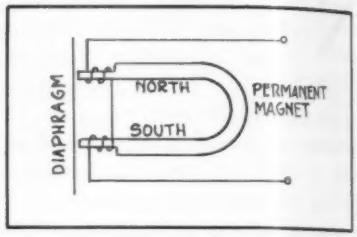


Fig. 1. A Simple Type of Passive or Generator Transmitter.

The output of this transmitter is very low, and the quality is usually not very good. About the only commercial application is when the ordinary telephone receiver is used as a transmitter for talking over short distances.

The Moving-Coil Transmitter: The moving-coil transmitter is another form of passive transmitter and is shown in Fig. 2. The direct-current winds provide a very strong magnetic field across the air gap. In this air gap is placed a coil of wire which is attached to the diaphragm, *D*. The coil is moved in this field when sound waves strike the diaphragm, and thus a voltage, which varies as the speech sounds, is induced in the coil.

In actual transmitters of this type, the magnetic field is usually supplied by strong permanent magnets. The dynamic transmitter or "microphone" used in radio systems is of this general type. The impedance of the voice coil is usually low, and a step-up transformer is accordingly used in the output.

Very recently (TELEPHONY, July 6, 1934) a manufacturer has placed on the market a telephone transmitter which operates in this manner. The output of this unit is fairly high. A transmitter requiring no battery or other source of power is, therefore available. With its associated receiver, conversations can be carried on over reasonably long distances.

The Ribbon Transmitter: The ribbon transmitter or microphone is also of the passive or generator type. This device is similar in *electrical* operation to the transmitter considered in the preceding paragraph, ex-

Answers to Problems in Twelfth Article

The answers to Problems 46, 47, 48 and 49 concerning principles of electricity, given in the twelfth article of this series entitled "Networks and Filters" published in the Sept. 7 issue of TELEPHONY, are as follows:

46. $R_s = 155.8$ ohms. $R_p = 421.6$ ohms.
47. $L = 0.04775$ henry. $C = 0.265$ microfarad.
48. $L = 0.02385$ henry. $C = 0.1325$ microfarad.
49. $L_1 = 0.4775$ henry. $C_1 = 0.03155$ microfarad. $L_2 = 0.00567$ henry. $C_2 = 2.65$ microfarads.

cept that a single metal conductor or ribbon is placed in a strong magnetic field. The sound waves cause the ribbon to move in this magnetic field and a voltage which varies as the speech sounds is induced in the ribbon.

This transmitter is widely used in radio and similar fields but is not used in commercial telephone systems. The impedance of this transmitter is very low, and a step-up transformer is used with it.

The Crystal Transmitter: The recently-perfected crystal transmitter operates on the generator principle, and is receiving wide application in radio and allied fields. The principle of operation is as follows:

When mechanical pressure is applied to some crystals, such as Rochelle salt, an electrical voltage is generated between certain faces of the crystal. Thus, if sound waves impinge on such a crystal—either directly or through a suitable diaphragm—a voltage proportional to these sound waves will be obtained. The output impedance of this transmitter is high, and it can be worked directly into the grid of a vacuum-tube amplifier.

The Electrolytic Transmitter: The electrolytic transmitter is not a passive or generator-type transmitter such as has been considered, but is of the *active* or *modifier* type. A source of electrical energy, such as a battery, is connected to this transmitter, and it controls the instantaneous power output from this battery.

The current flowing varies in accordance with the sound waves striking the diaphragm. This is accomplished by having a variable contact between an electrode and a dilute

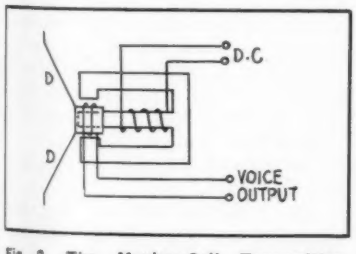


Fig. 2. The Moving-Coil Transmitter Consists Essentially of a Diaphragm to Which Is Attached a Coil Free to Move in a Strong Magnetic Field.

acid solution. The electrode is moved by the sound waves which strike a diaphragm. This transmitter was used in early telephone systems but is now largely of historic interest.

The Thermophone: The thermophone is another illustration of a modifier transmitter. In this device a fine wire is heated electrically. The speech sound waves vary the heat radiation from the wire and hence the resistance of the wire. In this way the output from a battery is caused to vary in accordance with speech sounds. Naturally, such a device is not used in commercial telephone systems.

The Condenser Transmitter: The condenser transmitter (and receiver) was discovered by one of the early telephone workers who found that his electrolytic transmitter (and receiver) would operate even after the electrolyte had evaporated. The modern transmitter of this type consists essentially of a thin metallic diaphragm insulated from, but very close to, a heavy metal plate; thus, forming a condenser. A battery is connected to this transmitter.

When sound waves strike the diaphragm, the capacitance of the transmitter is changed and a current flows through the circuit. By passing this current through a high resistance, a voltage is available which varies as the speech waves. This voltage must be greatly amplified before it is transmitted.

If a condenser transmitter and a condenser receiver are connected in series with a battery, the receiver will give out sound waves corresponding to those striking the transmitter diaphragm.

The Carbon-Granule Transmitter: The carbon-granule transmitter is the most widely used of all transmitters. One of the important reasons for this is the fact that the output of this transmitter is high; also, this device is rugged and the quality is good. Since it is an active or modifier type, the sound waves merely control the output from a battery. In fact, the electrical power output of this transmitter is many times greater than the speech power actuating the diaphragm.

The essential parts of a carbon-granule transmitter are shown in cross section by Fig. 3. The carbon granules are held in a cup in which a plunger fits loosely. The current from the battery is varied by the action of the carbon granules in accordance with the speech sound waves striking the diaphragm.

When the sound waves force the diaphragm *in*, the granules are compressed, the resistance is less, and therefore *more* current flows. When the diaphragm moves *out*, the resistance of the carbon granules is made greater, and hence *less* current flows. In this connection, it should be explained that sound waves consist of *condensations* (air pressure greater than normal) and *rarefactions* (air pressure less than normal).

Much progress has been made recently in carbon-granule transmitter design. Most manufacturers now have transmitters which work satisfactorily in handsets that are used in various positions. These transmitters have better quality and

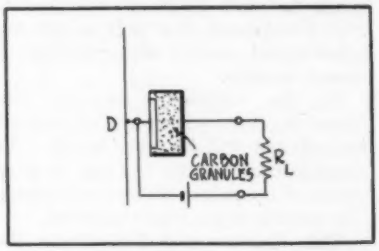


Fig. 3. Cross-Section of a Simplified Carbon Granule Transmitter.

greater output than the older desk-stand types.

Operation of Carbon-Granule Transmitter: The carbon-granule transmitters, or *microphones* as they are also called, are used in a variety of circuits. In all of these, a direct current from a battery flows through the transmitter. When the diaphragm is actuated by speech sound waves, the current is caused to vary in accordance with the speech. If a pure tone actuates the diaphragm, the current variations will be pure waves as shown in Fig. 4.

Referring to Fig. 3, if the transmitter of resistance R_t is connected to a load of resistance R_L, the direct current through the transmitter will be

$$I = E/(R_t + R_L) \quad \ldots\ldots\ldots\ldots (1)$$

The alternating-current component of Fig. 4 depends on many factors such as the pressure of the sound waves and the sensitivity of the microphone. For given conditions, the maximum speech output from the transmitter will occur when $R_t = R_L$; that is, when the resistances are matched.

From the preceding paragraph it follows that carbon-granule transmitters should be connected to a telephone line through a step-up transformer. If the resistance of the transmitter is 50 ohms and the line has a characteristic impedance of 600 ohms, the step-up ratio of turns should be $\sqrt{600/50} = 3.5$. When making a simple talking circuit consisting of transmitters and receivers in series, if high-resistance receivers are used the transmitters will not obtain sufficient direct current from the battery; also, the receivers will not obtain the maximum speech power from the transmitters.

Receivers: Any telephone receiver (or loudspeaker) consists of two parts: The *first* of these is the *acoustic radiator* which sets up the sound waves in the air. The *second* is the *motor element* which drives the radiator causing it to move and to radiate the sound.

In some receivers these two elements may be combined; for instance, in the ordinary telephone receiver the iron diaphragm is a part of the motor element, and it also radiates the speech sounds.

In the following sections only those receivers which are of greatest importance will be considered. The discussions will be limited to principles of operation instead of discussing various types manufactured.

The Commercial Telephone Receiver: If the operation of a receiver depends on the vibration of a part of the magnetic circuit, it is classified as a moving-armature type. The ordinary telephone receiver so extensively used in commercial systems is of this type, and will now be considered.

This receiver is illustrated in Fig. 1. The permanent magnet produces a constant pull on the soft-iron diaphragm. The alternating speech currents pass through the windings on the pole tips. The magnetic lines of force produced vary in accordance with the alternating speech currents. These lines, therefore, alternately add to and subtract from the magnetic lines of force produced by the permanent magnet. Hence the magnetic pull on the diaphragm will vary as the speech currents.

In this manner the diaphragm is caused to move, and to give out the speech sounds into the air. A coil of wire can be used instead of a permanent magnet to produce the constant magnetic field; this is seldom done, however.

As is well known, a weak permanent magnet causes a low output from the receiver. The magnet also serves another purpose, however. If no magnet were used with the receiver of Fig. 1, it would operate, but at a frequency *twice* that of the speech currents.

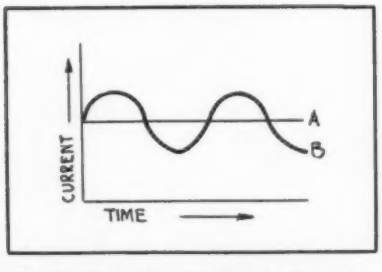


Fig. 4. If No Sound Strikes the Diaphragm of a Carbon-Granule Transmitter, Direct Current, as Shown by Line A, Will Flow. If a Pure Tone Strikes the Diaphragm, the Current Will Be Pulsating as Shown by Line B.

This double-frequency effect can be explained by Fig. 5. In the first illustration no permanent magnet is used. Suppose that a pure alternating current is impressed on coil *C*. As the current increases from zero to a positive maximum value, the diaphragm, *D*, is pulled *in* to the dotted position. The air particles on the right of the diaphragm will rush *in*, causing a *decrease* in air pressure and a *rarefaction*.

As the current dies out, the diaphragm will return to the normal position and in so doing will push the adjacent air particles *out*, producing a *condensation*. When the negative half of the alternating-current cycle flows through the coil, this same action is repeated, because the diaphragm is pulled *in* irrespective of the direction of the current flow.

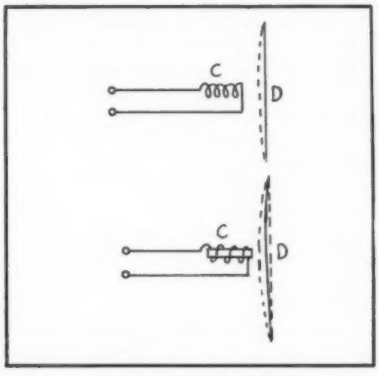


Fig. 5. The Permanent Magnet Shown in Lower Illustration Bows the Diaphragm in at All Times and Prevents the Receiver from Producing a Sound of a Frequency Twice That of the Speech Currents.

Thus, each half of the current cycle produces one rarefaction and one condensation, and these constitute one cycle of a sound wave. Hence, the sound radiated will have twice the correct frequency.

Now suppose that a permanent magnet is placed in the coil of Fig. 5. This magnet will cause the iron diaphragm to be pulled in at all times. As the current rises from zero to maximum in the positive direction, the diaphragm is pulled farther in to the dotted position. As the current builds up in the opposite direction during the other part of the cycle, part of the field of the permanent magnet is neutralized and the diaphragm moves out to the dotted position.

When the current returns to zero, thus completing the cycle, the diaphragm returns to the original position as shown by the full line. Thus, the diaphragm follows exactly the current variations, and one current cycle produces *one cycle of sound wave variations*.

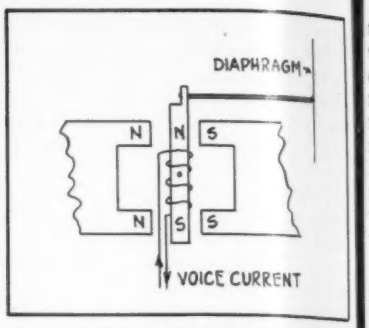


Fig. 6. Essential Elements of a Balanced-Armature Receiver.

The Balanced-Armature Receiver: The balanced-armature receiver of Fig. 6 is also of the moving-armature type. The illustration shown is one of several possible arrangements. The permanent magnet provides the north and south poles. For the direction of current indicated, the lines of force set up by the current will make the upper end of the soft-iron armature a north pole and the lower end a south pole.

Since like poles repel and unlike poles attract, the upper end of the armature will be moved to the right, pushing the diaphragm *out*. During the next half of the cycle the current will flow in the opposite direction and the polarities of the armature will be reversed. The upper end of the armature will then be moved to the left, pulling the armature *in*. The diaphragm used in this receiver is of non-magnetic material.

The Moving-Coil Receiver: The moving coil receiver is illustrated by Fig. 2. The voice coil situated in the air gap carries the alternating speech currents. This coil is in reality a conductor carrying the alternating speech currents, and this conductor is in a magnetic field. In telephone receivers the field is usually provided by permanent magnets instead of the coil as shown.

The reaction between the speech currents and the constant magnetic field causes the voice coil to move in accordance with the speech current variations. In telephone receivers the coil is usually attached directly to a thin diaphragm. In most instances the moving voice coils are of low impedance and should, therefore, be connected to the source through a step-down transformer.

The Ribbon Receiver: The recently-developed ribbon receiver may be considered electrically as a one-

turn, moving-coil receiver. This device is the reverse of the ribbon microphone previously discussed. The metal ribbon is placed in a strong magnetic field and the speech currents pass through the ribbon. The interaction of these currents and the magnetic field causes the ribbon to vibrate, thereby radiating sound waves.

This receiver is of low impedance and for maximum power input should be connected to the source through a step-down transformer.

The Induction Receiver: The induction receiver is not used commercially, but is interesting nevertheless. If a thin metal diaphragm (of nonmagnetic material) is placed near a coil carrying alternating speech currents, eddy current corresponding to these speech currents will be induced in the diaphragm.

If this diaphragm is also in a strong constant magnetic field, the reaction between these induced voice currents in the diaphragm and the magnetic field will cause the diaphragm to move in accordance with the speech currents, and to radiate sound waves.

The Condenser Receiver: Condenser receivers are similar in construction to the condenser transmitter previously discussed. If a voltage, which varies as the speech waves, is impressed between a thin metal diaphragm which is slightly separated from a fixed metal plate, this voltage will produce forces which will cause the diaphragm to vibrate, and to radiate speech sounds into the air. This receiver is a high impedance device. It is not used commercially.

The Crystal Receiver: The crystal receiver is a device which is the reverse of the crystal transmitter. When a voltage is impressed across electrodes properly placed in contact with the crystal, the voltage causes the dimensions of the crystal to change. These changes cause the radiation of sound waves. The crystal itself can be used to radiate directly into the air, or it can be mechanically coupled to a suitable diaphragm.

The Thermal Receiver: The thermal receiver or thermophone is largely used in experimental work. In this device a fine wire or thin strip of metal is heated by a constant current. The alternating speech currents are also passed through the wire. These cause the temperature of the wire to vary and thus to change the temperature of the adjacent air. These variations cause air pressure changes and hence the radiation of sound waves.

Summary: Various types of transmitters have been employed in commercial telephone systems. Of these, the carbon-granule transmitter or microphone is the most widely used. This device is rugged, the output is high, and the quality is good. A moving-coil transmitter has been developed recently which has a high output and which will probably find wide application for such purposes as interphones.

Many types of telephone receivers have also been developed. Of these, the permanent magnet type with the soft-iron diaphragm has proved most satisfactory. A moving-coil receiver corresponding to the transmitter discussed in the preceding paragraph has been perfected, and this also shows promise of wide use.

Problems:

50. A simple series telephone system is to be made by connecting at one end of a circuit a 50-ohm transmitter and an 80-ohm receiver in series.

A similar telephone transmitter and receiver are to be connected at the other end. The resistance of the line is negligible. A six-volt battery is connected in series to supply the power.

A. Calculate the current through the circuit.

B. Calculate the voltage drop across each unit.

51. Two "sensitive" receivers, each having a resistance of 1,000 ohms, are used instead of the 80-ohm receivers. Repeat parts A and B.

Work out the answers to these problems and hold them to compare with the correct answers. These will be published with the next instalment of this series.

DOING A ROUTINE JOB IN AN UNROUTINE WAY

(Published Through Courtesy of The Kansan, Monthly Publication of Western Telephone Corp. of Kansas)

Did you ever hear of doing a routine job in an unroutine way? In our company we have standard practices which have been set up from time to time to serve as a guide in order that service may move smoothly and efficiently. These established practices, 999 times out of 1000, are exactly what our individual jobs call for—but it is how we practice them that makes the difference.

The time has passed when any company or individual can consider the job more than half done if service—no matter how good—overlooks the importance of making and keeping friends among our public. The telephone operator, as an example, has certain set phrases to use, but a single phrase can be uttered in a variety of ways—some pleasant, some unpleasant, some abrupt and hurried, some as if we really wanted to please.

Contacts over the counter of the business office offer wonderful opportunities for personalized service. The customer may receive an impression of a brusque, cold organization, which is detrimental, or he may go away feeling that he is dealing with warm, courteous human beings, which is advantageous to our relationship.

It all depends upon the manner in which the employe behind the counter performs his job—whether he is performing a routine job or applying standard practices in an unroutine manner.

Local managers and plant men have many occasions to do the little things—render small courtesies—that make all the difference between a routine job done in the routine way and a job that applies the rules in a sensible, thoughtful and courteous manner.

Alertness to the customer's interest, interest in the company's welfare—that is the whole idea in a nutshell.

Standard practices smooth out the rough spots in our service and greatly improve our efficiency, but it is imperative that we avoid making mere mechanical routine of them. They are here to serve the telephone business, but they serve best in an unroutine way.

It takes constant thought and a real and personal interest in the public and, in turn, it makes the job far more interesting to us. For whether the day's work is interesting or dull and lackadaisical depends largely on whether we are a machine or a human being. The employes of the Western Telephone Corp. (Kansas) must not be robots.

Here and There in the Field

Specially Designed Pen Speeds Up Multiple Marking

To enable switchboard multiples to be marked more easily, E. A. Archer, district traffic superintendent of the New England Telephone & Telegraph Co., Providence, R. I., has developed a special pen which avoids the disadvantages of using the standard drawing type of pen in this class of work. Through the courtesy of Mr. Archer and Telephone Topics, the New England company's employes' publication, the accompanying illustrations and some information in addition to that published in the current number have been made available to a correspondent of TELEPHONY.

The usual pen employed in marking changed or removed numbers on subscribers' line jacks consists of a drawing pen mounted on a block and uses printer's ink. This was difficult to apply uniformly, especially on four-party line jacks where 25 per cent of the circumference must be reserved for each line. Running of the paint, chipping or peeling may make the results unsatisfactory, particularly where the operator must depend on such signals to give prompt and accurate reports to calling parties. Too much time was required to mix the coloring material and clean up the pen afterwards.

The new pen was developed on the basis of a fountain type of pen, and was constructed through the cooperation of the B. L. Makepeace Co., Boston, Mass. It is made of German silver and is provided with a simplified air vent. The outfit is provided with a reservoir holding 18 drops (applied with a medicine dropper) of a red water color paint furnished by the Triangle Color Co., Chicago.

The length of the pen over-all is 5 11/16 ins. and the total weight, including the mounting, is only 1⅞ ozs. It is provided with a wire plunger which closes the orifice at the bottom of the pen when it is not in use, and 1,700 quadrants were marked with one filling at the Pawtucket exchange. While weekly refilling is recommended, one of these pens was used for 45 days at Newport without refilling. A saving of about 50 per cent in time is gained by the use of the new pen as compared with the usual drawing pen.

• • •

"Tillie Fone" on Training in Public Relations

Training, I believe, has become an important part of the telephone business. For a good many years the traffic department and plant department have been doing a great deal of training work, but it seems that the training of employes that contact the public and must handle all customer relations has been somewhat neglected.

Some months ago a program of training was outlined for the people in our business office. At first there was a feeling of resentment among some of the older employes over the idea of having a younger person come in and tell them how to do a job that they had been doing for 15 or 20 years.

Methods that had been used over and over again, and without proper thought being given as to why they were used, are awfully hard to get away from. When the training work was first started and "dummy" contacts were used, I believe everyone felt sort of foolish talking to someone that he knew so well.

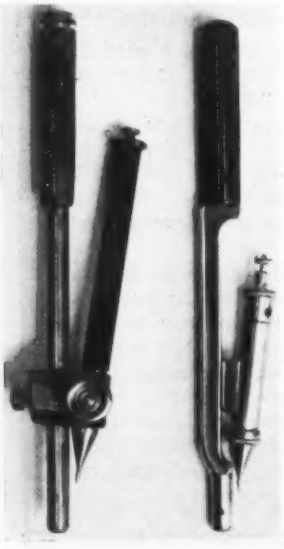
It was soon realized, however, that these practice contacts could improve our ability to handle the most important item of business office work. It seems reasonable that you must practice how to handle the contact satisfactorily, because if it takes practice to learn how to play the piano, to play golf or bridge, certainly it will take practice to become proficient in the art of handling contacts with the telephone customers.

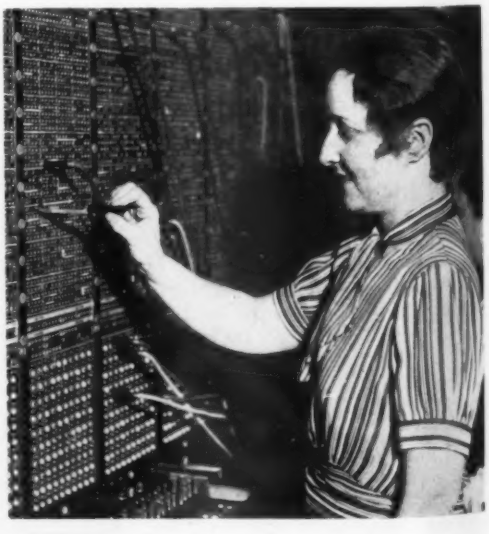
After the training work had been under way for some weeks, most of us realized that we needed the practice and that the dummy contacts and practice did make us more valuable to our job and our job more valuable to us. The real reason, however, that we were reluctant to perform to the best of our ability was because the manager, the training instructor and some of our fellow employes were there watching us. Frankly, I think we were stage shy.

When it was finally realized that all this work was being done for our mutual good and that we should all cooperate to improve and perfect our customer contacts, this feeling was soon dissipated.

Although we have had this training work in our office only a short time, I know that everyone now feels indebted to the manager and the instructor for the help that they are giving us. And when the instructor helps me make a better interview and apply the right kind of sales effort so that I make more sales per interview than I had before, I am satisfied for him to make suggestions of that kind to me just as often as he wants to do so.

I know all of us in the office have





To the Right Is Seen Miss Ellen A. Lennon, Supervising Clerk of the New England Telephone & Telegraph Co., Using the New Multiple Marking Pen Designed by District Superintendent E. A. Archer. The Illustration to the Left Shows an Enlarged Reproduction of the Pen Alongside of the Original Model (to the Extreme Left).

changed some of our ways. Some of us smile a little more frequently; we handle our work with a great deal more ease, because it has been made easy for us. We have been shown the easiest way to perform a certain job, whereas formerly we were doing it the hard way.

It made me realize one thing, that if I couldn't be at ease during a training lesson before the manager, fellow employes and the instructor, perhaps I had not really been at ease in talking to the customers. Now that I am at ease during these training classes, I have checked myself on a few occasions and find that not only am I at ease with the customer but the customer is at ease with me.

And when the customer feels that I am going to be of service to him and has confidence in my ability to take care of his needs, then I am going to have successful business office contacts.

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Cooperation of Companies With Trade Organizations

Evidence of the value of cooperation with trade organizations by telephone companies can be seen each month in the Indiana Food Merchant, official publication of the Indiana Retail Grocers & Meat Dealers' Association, Inc. Appearing therein is a series of articles stressing the value and importance of the telephone in the food merchant's business and urging its greater use. These articles are the direct result of the proper cooperation on the part of The Home Telephone & Telegraph Co. of Fort Wayne, Ind., with this association.

The appearance of these articles in a magazine read by 75 per cent of all the retail food merchants in Indiana can be attributed to a desire on the part of Charles J. Steiss, state secretary of the organization, and editor of the Food Merchant, to publish material not only interesting but that which will aid in increasing each merchant's business.

When the first article seemed to call for another, a series of informative stories concerning the real value and proper use of the telephone in the grocery or meat market of today was arranged. A recent issue of the magazine carried an illustration on its cover showing a grocer making proper use of the telephone in his store.

The following excerpt from the article contained in the May issue of the magazine briefly illustrates the important effect these messages have been carrying:

"Recent issues of the Indiana Food Merchant have carried brief articles on the importance of the telephone in any merchant's business. Already we have received a number of comments from our readers. Several of these comments have been accompanied by suggestions. Well, these articles have had the same effect upon us. They have proved to be doorways to additional thoughts. Now we are promising you future articles on the subject for several months to come. We think it is that important.

"Thus far we have stressed the importance of the merchant having sufficient telephone service in his store and how he could best make use of it. We thing the term *sufficient* should now be defined.

Do you have enough telephone lines to permit your customers to reach you without delay? You should. No merchant would expect customers to wait at the door until he unlocked it.

Do you have enough telephone lines to permit proper solicitation of your customers daily? You should. Daily contacts are most important if you expect your store to get your customers' business.

Now, it may be that you can't answer these questions. It may be that you do not know whether or not you have sufficient telephone service. You probably think you have. Otherwise you would have added additional lines. But frequently merchants lock their doors to business by trying to handle a heavy load of telephone calls during the busy hour over one or two lines.

If you can not reach a decision on this question, your telephone company will be only too glad to aid you. You can find out just how many busy calls, for example, you are having during the day or during a busy period."

• • •

Gas Bomb Explosion Fails to Rout Operator

Tears were shed freely recently by Miss Marie Knott, switchboard operator at the Fort Wayne (Ind.) National Bank, when a gas bomb accidentally exploded in the building. Although nearly blinded for a time, Miss Knott remained at the switchboard, accepting all incoming calls and handling other connections.

She was stationed on the bank mezzanine, directly above the desk in which the bomb exploded. The fumes swept upward with almost overwhelming swiftness, but failed to rout Miss Knott from her post of duty. She received congratulations from bank officials for her loyalty.

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Useful Ideas: Improving Grip on Handles

A great many devices are commonly applied to wire handles or bails of lanterns, pails and other containers to afford a better grip for the hand when protected by gloves or mittens, and at other times when wet and slippery. Many of them soon loosen and become useless.

This Convenient Handle for a Pail or Lantern Was Made With a Piece of Insulated Wire Securely Soldered at the Ends.

A piece of common insulated wire attached to the handle, as shown in the accompanying illustration, will afford an excellent handle that will "stay put." First scrape the wire at one end and fasten it securely with one or two touches of the soldering iron. Then wind the wire snugly around the bail or handle of the container and, while holding it securely in place, fasten the other end of the wire in the same manner. The insulated wire affords a convenient knurled grip. Moreover, it is waterproof and will stay solidly in place for a long time in spite of continual use of the container.

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Recent Experiences of the Schrooch Family

Armchair, Ozarkiana,
September 28, 1935.

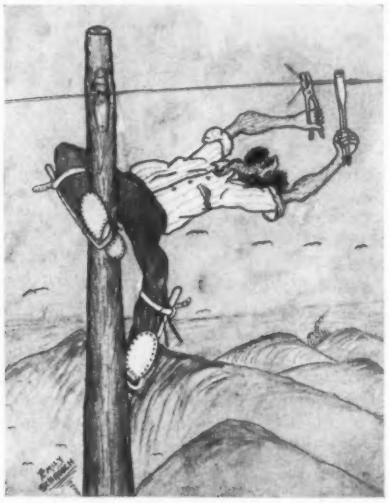
Dear Mr. Telephony:

My husband, Mr. Schrooch, ast me to write and hand you this panarama of himself made under the terrific strain of the good old days when safety straps were taboo, when unsoldered three wire line joints and hand-forged eastern climbers were all the rage. You will be surprised when I tell you that Mrs. Schrooch (which is myself) made this sketch shown on page 24. And I don't think it's such a bad job eyther, do you?

Well, it just goes to prove that if

Beacon, our son, and Ed, my husband, get too busy this winter with their engineering capabilities, why, I'll just get out my old drawing board, my crayolas and my thumb tacks and make some picktures which your subscribers will be proud of. I may do this anyway even if they don't get too busy, because I didn't know I "could" draw so well. Beacon said it was better'n he coulda done and since he is a better drawer than Mr. Schrooch I guess the statement speaks for itself.

You will be surprised when I tell you that the joint Ed is making in the picture was 20 years old the fifth of last December and yet he just finished making it yesterday. That's rather a ribald statement but it goes like this. The pole, which Ed is on, is on top of Hook Mountain and the line belongs to The Western Onion Telegraph Co. When the



Ed Schrooch Portraying the "Good Old Days" When Eastern Climbers Were All the Rage and Safety Belts Taboo.

line was run 20 year ago this joint was never finished, neither was it tied in on this particular pole. I think that someone hollered "beans" about the time a lineman was making it and, without waiting to finish, he just laid the line up over the bracket and beat it for dinner.

Somehow or other the inspectors never seemed to be able to get anybody to finish this pole after the slack was pulled and the gang had departed. Ed, my husband, got a letter from the company, which owns the line, to go out and fix up this joint and to send in his bill when it was done. He sent Beacon out to do the job, who was gone about a haffa day coming back about noon, telling Mr. Schrooch that he couldn't reach the joint it was too far out.

This made my husband hot under the collar and he says, "I'll bet you didn't even climb the pole." "No, I didn't," says Beacon. "The pole was rotted at the butt and since it wasn't tied in I was afraid to, and besides I couldn'ta reached fur enough if I had clumb it."

That last remark made Ed warmer than ever and he said: "You come with me, young man, and I'll show you how to fix that joint and I won't tie the wire in or use any safety belt either. You durn moderns have to have a settee to recline in while you're twisting your wires or you can't do it. I'll show you how we had to work when I started in the game."

With that statement I heard Mr. Schrooch pawing around in an old lineman's tool box which he kept in the back room and directly he resurrected a pair of the old eastern climbers (see picture if you want to know how they're made) that he used to wear when he was purring for the old Bilgewater Telegraph in years gone by. Soon I heard him and Beacon getting ready to go back up the mountain and right then I decided I'd better go along and convert a catasstrofee if possible because I know that when my husband is a little peeved he'll try to climb anything that can be spurred.

"Meely" Earhorn, our chief night switch, was still in bed so I had her get up to run the board while I was gone. Well, Ed fixed the joint, tied the line in, and we all come back to dinner without any mishaps, much to the shaygrin of Beacon who saw how easy Mr. Schrooch fixed up a little work that had looked nigh impossible to him.

I wouldn't have clumb that pole for all the dime chain letters in the world, and I'm a fair climber at that. I'll tell you some time about how I took care of our exchange once for about three months while Ed was sick. I learned to climb then but I recken if he hadn't got well when he did I'd a had all my dresses slit from the bottom up, where I run my feet through from time to time trying to spur the poles. I may perhaps make some sketches of myself as I can easily remember many of the antics which I cut shooting-out the line troubles.

In an article which I clipped out of the Popular Hair Magazine, was a letter addressed to the "Hillie Billie Tellafome Co." which read:

Dear Friends:

You'll have to bare with us a mite on our bi-annal fome bill this time as our otto payment comes doo now the same time our husband gits his penshun.

Yores trooley,
EGGLEBERRY SISTERS.

Mr. Schrooch, my husband, was looking on page 34 of April 13 of TELEPHONY at one of them "Canty Fault Finders" and was wondering if it would help him locate them rusty joint troubles out on line 12. This is the line that old Mrs. Flooty is on and he said that if it is a better fault-finder than she is, he'll buy it. The Flootys have been renting a tellafone from us as far back as I can remember but they're mad about something. They always send their hired hand, Fulcrum Flattwallett, to pay the rent. By the way, Fulcrum was looking for fish worms last week and raised up a board out near the barn. Low and behold if he didn't find a rat nest lined with five-dollar bills. "Fulk" reports plenty of applications for work out his way of late.

Miss Earhorn says to tell you that she'd like a new switchboard for a Christmas present as this one is getting so slick she can't ride it any more without spurs. Well, that'll be all.

Respectfully yours,
GUMVILLE TELO EXCH & MFG CO.,
Per Em (Harper) Schrooch
General Manager.

MOTTO: Opportunity knocks on my door every day no matter what the neighbors say.—From the private diary of C. Edw. Schrooch.

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Building Up Small Telephone Exchanges

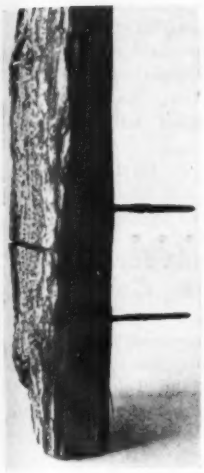
A most helpful and inspirational letter to his co-workers was written by General Manager L. D. Densmore, of the Southeast Public Service Corp., Charlottesville, Va., under date of September 16 and published in the company's house organ, the Southeast Division News of that date. Telephone employes, he says, must be real business builders, particularly in our small communities. Continuing, Mr. Densmore said, in part:

"The citizens of many of our smaller towns must sooner or later realize that good telephone service is a community blessing, the continuation of which will require the patronage of every business house and every home which can afford to pay the monthly rate for service, in order to keep a telephone exchange in the community."

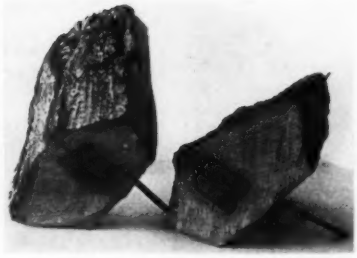
In commending several of the company's employes for their outstanding effort in the direction of building up the small exchange, he commented:

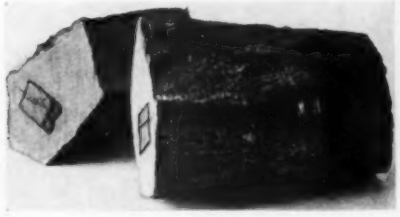
"They are each day finding opportunity to remind non-subscribers of the benefits which they receive from telephone service in the community without having paid a cent to keep the exchange there. They do not let a non-subscriber who could pay, use another subscriber's telephone without a tactful reminder that we want and need his patronage.

They know how to appeal to the spirit of community interest and to the sense of fairness and, above all things, they know how to make folks realize what it is actually worth to every citizen to have *even one telephone in a community*."



Sectional Views of Elm Tree, the Growth of Which in 14 Years Enclosed a Line Bracket and Insulator. The Section of the Tree Was Given to Wm. Ungrodt, Field Inspector on the Engineering Staff of the Wisconsin Public Service Commission by Carl Mess, General Manager of the Price County Telephone Co., Phillips, Wis.





Plant Men Get Together

Why Living Trees Are Not Good Telephone Poles

The use of trees to support telephone line wires is not approved practice but attachments are made to trees now and then, nevertheless. An excellent example of what may happen when this is done was found recently by Carl Mess, general manager of the Price County Telephone Co., Phillips, Wis.

A bracket with an insulator had been attached to an elm tree about 20 years ago. Because of highway relocation the telephone wire was removed and the bracket abandoned, some 14 years ago. Since then the growth of the tree enclosed the bracket and insulators as shown by the accompanying illustrations at the top of this page.

The tree was recently cut down and the section enclosing the bracket and insulator was turned over by Mr. Mess to Wm. Ungrodt, field inspector on the engineering staff of the Wisconsin Public Service Commission. A study of the illustrations will convince anyone of the danger of attaching line fixtures to trees.

• • •

Lincoln T. & T. Ranks High in Safety Contest

Passenger cars owned by the Lincoln (Neb.) Telephone & Telegraph Co. ranked first in the national fleet safety contest sponsored by the National Safety Council, during the month of July. These cars were driven a total of 60,039 miles during the month without a single accident, more miles than were recorded by other fleets that ended the month without an accident. Sixteen fleets competed.

A truck accident, however, put the company into tenth place in that class. The accident average for the month, however, per hundred thousand miles, was but .96 per cent, compared to 2.3 accidents average by the other competing fleets.

• • •

The Uneventful Life of a Trouble-Shooter

By Doc

Numerous have been the changes in the life and work of a trouble-shooter during the past 30 years. These changes have all proved real advancement and have not only improved the telephone service but have also made the life of the trouble-shooter a bit easier.

Perhaps the greatest of these improvements is telephone transportation, for the modern telephone troubleman's car, with its all metal body, apparatus trays, material drawers and reels leaves nothing to be desired by a trouble-shooter on the job.

I remember well the first telephone car I had assigned to me, old 66. It was a Model T Ford of the vintage of about 1910 with large wooden wheels, carbide lights and a high, awkward ladder rack fore and aft that gave it an appearance of moving sideways like a crab.

In this conveyance we whizzed along the road from 10 to 15 miles an hour and marveled at the terrific speed. Usually though, after traveling for a few miles, we would have to stop and repair a tire as we carried no spares. When troubles happened, we just patched the hole and then inflated the tire with a hand pump.

The roads in those days were terrible and one would not think of attempting to drive a modern car over them. Looking back now I sometimes marvel as to how we ever covered the hard miles that we did with those ancient gas buggies, though even with their numerous imperfections they got us over the roads in which less time than any other means of transportation previously used.

At that time automobiles were comparatively new and not trusted, so the company kept a careful check of them and their operation cost. A mechanical inspector visited us at fixed intervals to make sure the cars were being properly maintained. He invariably "bawled us out" for not keeping the outside of the motor clean, although he never seemed to be concerned with any knocks which might be coming from the inside of the motor.

I feel sure that the transportation costs and living expenses of this inspector were much in excess of what local repairs would have cost at a public garage. The fact of the matter was that when anything went wrong with a car, we had to have local repairs made, for the company mechanic would always be miles away.

The cars, even with their mechanical defects, proved of real benefit to us in our work right from the start. We could get out in the morning, install a couple of telephones, go out and clear a case of toll line or rural trouble and then come back and probably move a telephone before quitting time. Our company had much to say about the cost of automobiles but I believe that proper consideration was not given to the increased volume of work performed by the men using them.

Many amusing incidents happened to us with the early-day automobile, though they were anything except amusing to us at the time. I remember once we burned out a connecting-rod bearing, due to the oil getting low in the crank case. Fearing that we would be blamed

for neglect, we bought a new connecting rod and worked all night installing it. We were ordered out on a case of toll line trouble early the next morning, and the old car took us through without difficulty, so we must have done a good job on it.

Another time the water in the radiator got low on a hot day while I was out on a toll trip, and in that section of the country water supplies were usually miles apart. Fearing another burned-out bearing I found a gentle cow in a nearby pasture, milked her in my hat and filled the radiator, and thereby saved the day. I have always hoped that no babies went to bed hungry that night.

"Doc's" First Trouble – Shooting Car, No. 66. ("Doc" Is on the Right.)

Modern automobiles which will travel 90 miles per hour and can be run 50,000 miles or more without an engine overhaul, with tires that travel 20,000 miles or more without a flat, are certainly nearing mechanical perfection. I will wager though that the owners of the modern cars do not derive any more pleasure from them than we did with our wheezy, coughing, old gas buggies, as we went skidding along a sandy trail, dodging rocks and looking for a case of toll trouble.

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Some Telephone Things I Didn't Know Until Now

By Oscar Will Tell

That cable-splicers' "snips" now have rounded points instead of the old sharp-pointed dangerous kind.

That a lamp guard is an excellent tool to place in a heavy multiple to prevent burning insulation from skinners with a soldering iron when clearing trouble.

That a syringe type hydrometer is now available which is permanently fastened to the filler plug of a sealed glass jar type storage battery. The principal advantage claimed for this instrument is that no electrolyte is lost from the pilot cell, no matter how often the gravity readings may be taken.

That the effect of metallic paint, such as aluminum, on a heating radiator in a telephone exchange is equivalent to removing 1/6th of the radiator or nearly 17 per cent, or as if one section out of six had been removed. Thus a radiator of five sections, painted with white or a light-colored paint, should be about as effective as another of six sections painted with metallic paint (gold bronze, aluminum bronze, etc.). If your radiator is painted with a flake metal pigment, such as aluminum, gold or bronze, the efficiency is reduced about 25 per cent. If it is painted right over the aluminum, for example, with enamel, the heat transmission is the same as the bare metal.

• • •

Car Hits Canal Bank; Leaps Through Toll Wires

Four young people from Harlingen and a girl from La Feria, Texas, miraculously escaped death when their sedan struck a canal bank at the intersection of the Military and Boca Chica highways, near Corpus Christi, and leaped 139 feet over a railroad crossing, struck the ground and turned over several times, finally bursting into flames, according to an account published in the Southwestern Bell News.

A toll line of the Southwestern Bell Telephone Co. and a line of the Western Union Telegraph Co. paralleled the railroad which crosses the highway at that point. Both lines have standard clearance over the pavement, but the car leaped high enough to tear several wires from the two lower telephone crossarms and three wires from the Western Union line.

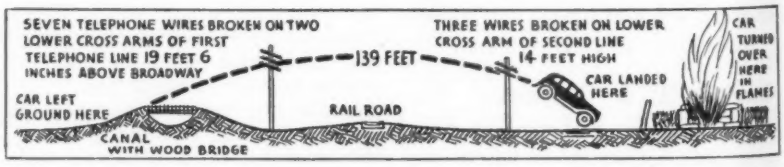

SEVEN TELEPHONE WIRES BROKEN ON TWO LOWER CROSS ARMS OF FIRST TELEPHONE LINE 19 FEET 6 INCHES ABOVE BROADWAY
139 FEET
THREE WIRES BROKEN ON LOWER CROSS ARM OF SECOND LINE 14 FEET HIGH
CAR TURNED OVER HERE IN FLAMES
CAR LANDED HERE
CAR LEFT GROUND HERE
RAIL ROAD
CANAL WITH WOOD BRIDGE

Diagram Showing How a Speeding Sedan Leaped from a Canal Embankment Near Corpus Christi, Texas, Tore Through Two Spans of Wire, Returned to the Highway, Turned Over Several Times and Permitted the Five Terrified Occupants to Escape With Only Minor Injuries Before It Burst Into Flames.

These irrigation canals are built up higher than the surface of the surrounding ground. Where they cross a highway the road on both sides must be graded up, and a bridge placed across the canal. The speeding car followed up the near slope, then took to the air like a projectile.

Strange to relate, the five occupants of the car escaped with only minor injuries.

Testboardmen at Harlingen are still searching for a toll trouble code, "Motor vehicle passing through aerial wire."

• • •

Alarm Circuit for Protecting Cable Splices

Ingenious, practical and economical is the alarm circuit devised by George E. Phinney of Lynn, Mass., cable foreman of the New England Telephone & Telegraph Co., to protect during repairs a section of toll underground cable that crosses the Saugus marshes.

To protect splices from damage from the flooding of manholes by the tide during the night, Mr. Phinney sealed an empty bottle and suspended it by a string to the hookswitch of a telephone installed in the manhole and connected to the local exchange.

If the tide flooded the manhole, the bottle would rise and operate the hook switch, whereupon the operator would call Mr. Phinney before water damaged the splice. His plan not only gave the cable splices perfect protection, but gave Mr. Phinney a sound night's sleep, since the manhole was not flooded.

• • •

Bland, Va., Now Has Telephone Exchange

The Inter-Mountain Telephone Co., with headquarters at Bristol, Tenn., on August 27 cut into service at Bland, Va., a new telephone exchange serving 36 subscribers. Several new rural lines are soon to be built to serve the contiguous farming sections and these are expected to augment the present subscriber list.

The central office installation was made by C. H. Jennings and the outside plant work was under the supervision of Tom Barnes, plant man from Wytheville, the toll center of the new exchange.

The outside plant of the Bland exchange has all-cable distribution with rubber-covered drop wires. Creosoted poles were used throughout. In building the toll line to Wytheville, No. 104 copper wire was used.

The Operators' Corner

By MRS. MAYME WORKMAN

Traffic Supervisor, The Illinois Telephone Association, Springfield, Ill.

TELEPHONE work is just as fascinating, appealing and interesting today as it was 20 or 30 years ago. Series No. 212

THE AVERAGE person will react favorably to a kind or courteous suggestion or request, but try to drive him or command him to perform a task, in a dictatorial manner, and he becomes stubborn as a mule. Some people in a supervisory capacity are prone to try to obtain results by ruling with an iron hand, by inspiring fear, rather than through the exercise of kindness, combined with firmness.

When these tactics are followed, the results are usually disastrous. They are usually sincere in their efforts to obtain results, never realizing that they are tearing down that which they are so anxious to build up—teamwork, cooperation, discipline, loyalty and harmony.

Today, more than ever before, people resent being "bossed" as they term it. However, satisfactory results can still be obtained by studying the individual, using just the right method of approach in contacting them.

Telephone work is just as fascinating, appealing and interesting today as it was 20 or 30 years ago; if anything, more so with our modern equipment, improved environment and greater field of operation. Operators are just as zealous and eager to do a good job; but as our equipment has been modernized and our routines revised, so also must our methods of supervising be adjusted to fit into present-day conditions and mode of living. In other words, we must cultivate the art of adaptability.

If the supervisor will seek all the good things it is possible to find in each operator's work, she will not only make her own task more pleasant; she will also be able to help the operator in overcoming her shortcomings. By first pointing out the good features in her work, she will put the operator in a receptive frame of mind in order to call attention to the irregularities which need to be corrected. Too often we are prone to seek the other person's weak points while entirely losing sight of their virtues. Elbert Hubbard once said:

"I try to fix my thoughts on the good that is in every soul, and make my appeal to that. And the plan is a wise one, judging by results. It secures for you loyal helpers, worthy friends, gets the work done, aids digestion and tends to sleep o' nights. And I say to you that if you have never known the love, loyalty and integrity of a proscribed person, you have never known what love, loyalty and integrity are.

I do not believe in governing by force, or threat, or any other form of coercion. I would not arouse in the heart of any of God's creatures a thought of fear, or discord, or hate, or revenge. I will influence men, if I can, but only by aiding them."

Questions from Illinois Operators

1. In exchanges not handling their own toll tickets, upon receipt of a "WH" report from a distant operator, what phrase should be used in notifying the distant operator to whom she should pass her "WH"?
2. A station-to-station long distance call is placed after 8:30 in the evening but is not talked on until 4:30 in the morning. What rate does the call take?
3. What would be the correct thing to do if you had an "in collect" call to a non-published telephone?
4. If on a collect station-to-station call the called station does not accept the charge, how should you proceed.
5. Can you hold the line on a "BY" number of a direct circuit?

For answers to these traffic questions turn to page 44.

• • •

Night Operator Summons Help by Fire Siren

Hearing a disturbance and several pistol shots in front of the Citizens State Bank at Frost, Texas, located beneath the telephone exchange office of the Mid-West States Utilities Co., Night Operator A. L. Brittain promptly switched on the fire siren summoning immediately all the help possible, thinking an attempt was being made to rob the bank.

Then rushing to the window, he saw two wounded men lying on the sidewalk, one of whom was the bank night watchman. He returned to the switchboard and telephoned an emergency call to a doctor and then called for an ambulance. Shortly thereafter he put through a long distance call to Corsicanna for hospital emergency service for the wounded watchman, the other man being already dead.

It developed that a prowler had accosted the night watchman and ordered him to put up his hands. The night watchman refused and the thug shot at him five times, three of the bullets hitting and seriously wounding the officer. After he had fallen, the night watchman pulled his gun and killed the other man.

Mr. Brittain displayed cool judgment and rare courage when he heard the pistol shots ringing out in the night. He had no way of knowing how many men were on the street or if they had gained admittance to the bank and had arranged a bomb to explode any minute to blow open the vault. He handled the situation with admirable initiative, resourcefulness and bravery.

• • •

Fort Dodge, Iowa, Telephone Office Robbed

The Fort Dodge Telephone Co.'s office at Fort Dodge, Iowa, was held up recently by three armed, unmasked bandits, who forced the office staff of six girls to lie on the floor while they took several hundred dollars in cash. The bandits escaped in a car waiting in front of the telephone office. A valuable watch and some private papers of Manager J. M. Plaister were also taken.

The robbery occurred shortly after 1:00 p. m. on September 25, when three well-dressed men followed a woman customer into the telephone office. The leader, after first displaying a badge to one of the employes, leaped over the counter separating the office from the lobby and snapped out an order to the girls: "Get on the floor, all of you!" He forced the switchboard operator to join the other girl employes on the floor, so that she could not send out an alarm.

In addition to the customer, Mrs. J. T. Kaveny, the telephone employes in the office at the time of the robbery were: Miss Grace Quigley, Marjorie Heflin, Margaret Belsheim, Ruth Thorson, Velva Hay and Leona Bradley. The loss was fully covered by insurance. The amount of cash on hand was less than it would have been at another time of the month when pay station receipts would have been turned in.

DEATH BY FIRE

By JAKE THE LINEMAN

MANY happy families—almost the whole population of the small town—had made their way to the little two-story frame schoolhouse to witness a play given on the second floor by the children of the community as part of their commencement day exercises. It was a happy crowd and the play was being well received by an appreciative audience.

Suddenly, during one of the high-spots of the play, an oil lamp was overturned. Little flames followed the path of the oil, eagerly devouring every particle of combustible material. The flames ate into the rugs, the floor, caught onto curtains and spread upward until they reached uncontrollable proportions. Fathers, mothers, friends and little children sat awe-stricken for a moment. Then PANIC—that pal of disaster—struck and bedlam broke loose.

Almost as one, people arose from their seats. Human eyes bulged with fear until they lost their natural contours. Strong men sweat and became weak. Eagerly the crowd rushed for the one small door which led to the stairs. Over chairs which sometimes crumpled under the weight and through narrow aisles, the fear-crazed humans fought, elbowed, kicked and forced their way toward the small entrance which, to them, seemed to be the only division between life and death.

Unmindful of those who were falling, to become human floor mats, they pushed on. Small children screamed as they felt the pressure of the mob choking off their breath, women fainted and fell to the floor where their bodies were literally kicked and pushed by the feet of the panic-stricken mob until the last thread of life had been stamped out of them.

Without warning, the stairs—weakened by flames and the excess weight of those who had finally reached them—gave way. Loud shrieks rent the air as humans fell with the stairs into the flames to their deaths. With the stairway gone, three small windows on the second floor were the only avenues of possible escape from the choking, blinding smoke, the licking flames and the excessive heat. Death from falling was far preferable to death by fire, so to the windows the mob jammed its way. Many jumped and were killed. A few escaped with minor injuries. But many faltered and fell before reaching the windows, and when the flames finally died out rescuers found only a mass of roasted, charred bodies.

When the results of the careless handling of one small oil lamp were summarized, it was discovered that 75 persons had lost their lives and that family after family had been wiped out.

Such tragic occurrences are not uncommon. Fire—man's best friend—has been turned into one of man's worst enemies by carelessness. Hardly a day passes but some newspaper carries the story of a home or building which has been turned into a roaring crematory by FIRE! Perhaps a shudder creeps up and down our spines as we read the gruesome details, but too many of us are prone to feel sorry for the victims and then promptly forget the matter, failing to realize that unless care, precaution and common sense are used the same papers may some day carry a grueling story telling how our unlucky bodies were burnt to a crisp by a fire which could have been prevented.

Well do I remember reading of a fire which happened in another school. This school was a sturdy, modern, three-story brick building and possessed ample fire escapes. One day smoke bellowed forth from its windows and the school fire alarm was sounded. The main floor pupils marched out in orderly, soldier-like fashion, but there was some delay on the upper floors. Fire had cut off the children's approach to the front entrance and they were forced to do an "about face" and direct their steps toward the rear entrance.

Maintaining orderly lines, the leader led them to the rear door—only to find it locked! Children are only children and when they found that the door would not open, that their chances of escape from the flames were cut off by a locked door, their spirits broke as the spirits of humans do when death is so close. A few dropped from the windows, but others fought with the door. When the door was finally pried loose, the rescuers saw only a stack of tangled children; children stacked 12 feet high and so jammed that their arms would jump out of their sockets before their bodies would budge. Buddies, that's another example of what fear, fed by a roaring fire, can do.

Not long ago, over in Schenectady, N. Y., a woman poured out a pan of gasoline and proceeded to clean a blouse in the kitchen on the main floor of the house. As she worked a maid opened the cellar door and went down to look at the fire in the furnace. In less time than it takes to tell, the fumes from the pan of gasoline, seeking the lowest level, had rolled downstairs to the cellar floor, had been sucked up into the ash pit of the furnace and up into the fire pot. Instantly a blue ball of flame appeared, ran back along the vapor stream and upstairs to the pan of gasoline where it caused a flash and an explosion. The explosion wrecked the dwelling, sent four persons to their graves and sent three other horribly-burned humans to a hospital.

Over in New Jersey a young girl switched on a light while her mother was doing some dry-cleaning with gasoline. The fixture sparked and the explosion blew both of the women through the window—dead!

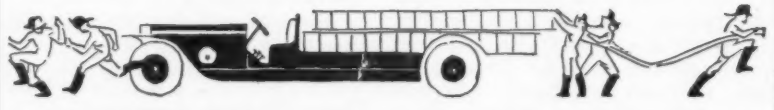
If more people would realize that it takes the vapor from only one tablespoonful of gasoline to carry a car up a moderate-sized hill—they would soon see that it's mighty easy for the vapor from a panful to carry a human being right up to the pearly gates!

Some time ago a prominent fire

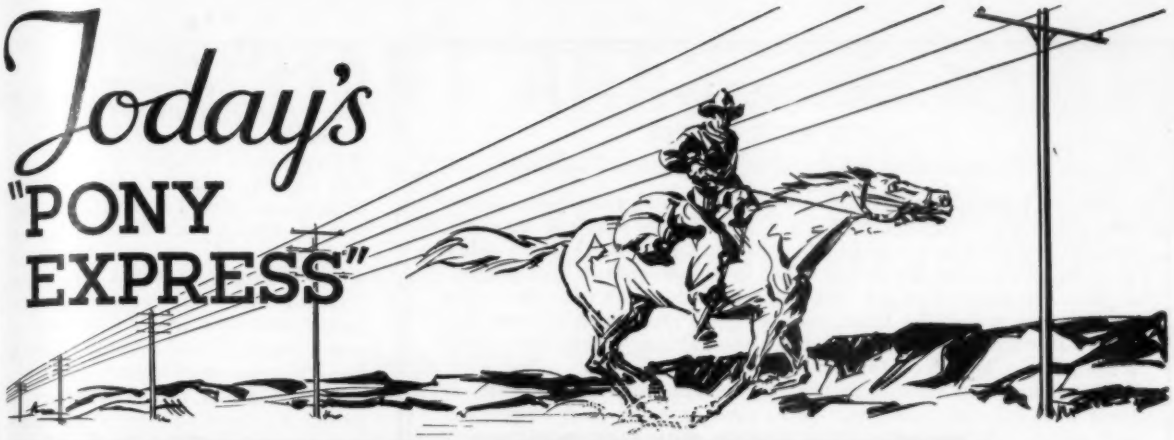
FIRE PREVENTION WEEK

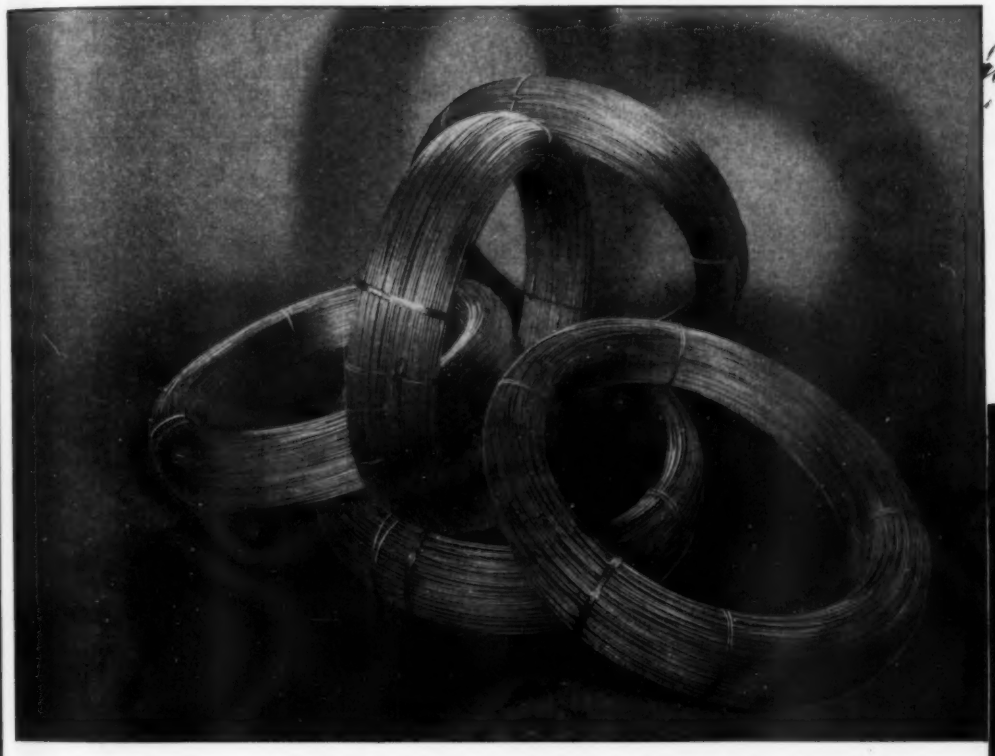
October 6-12

DO YOUR PART TO PREVENT FIRES



Today's "PONY EXPRESS"





The Button test—demonstrating the flexibility and tenacity of the zinc coating which is applied to Perfected Telephone and Telegraph Wires.

OVER the lonely prairies where once the Pony Riders galloped, today run millions of miles of Perfected Telephone and Telegraph Wire. Millions of miles of safe, consistent service—because of absolute uniformity in the wire itself. Uniformity such as only the world's largest producer of wire could build into a product. Perfected Telephone and Telegraph Wires are produced in the standard reliable brands—"Extra BB"—"BB" and "Steel"— each heavily and uniformly galvanized—assuring uninterrupted service. There is a type of Perfected Strand to meet every need—efficiently, dependably and economically. All our strand is so constructed that the strand may be cut at any point without making seizings. In construction work this is a time-saver and a great convenience.

AMERICAN STEEL & WIRE COMPANY

208 S. LA SALLE STREET, CHICAGO · · EMPIRE STATE BUILDING, NEW YORK

Offices in All Principal Cities

Pacific Coast Distributors: Columbia Steel Company, Russ Building, San Francisco

Export Distributors: United States Steel Products Company, New York

United States Steel Corporation Subsidiary

PIN-PICKER-UP

By MISS ANNE BARNES

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

There is an old saying, "If you see a pin and pick it up, all day you will have good luck." A lot of people take that old saying so seriously that they never fail to pick up a pin; but I don't unless it looks like a good pin and is lying in a reasonably clean place.

Most pin-picker-ups are just hoping for a streak of luck coming to them from out the blue sky, but luck just doesn't come that way. However, "it is indeed a useless saying that doesn't carry a moral," so, let's look for the moral.

Folks who are careful in the performance of minor details in their work—avoid waste, etc.—*earn* good luck for their employers, and often put themselves in a position with their employers to earn more.

Many of the world's greatest financiers started out in business life, when boys, by being careful about what appeared to be trifles, but which really were stepping stones on the pathway to success. One of these financiers got his start as only one in thousands might have done. When he was just a boy he interviewed a wealthy old man about a position. The old man made short work of the interview by telling the boy he had no opening for him. Naturally, the lad was embarrassed and disappointed but, as he turned to leave the room, he stooped and picked up a pin.

Perhaps, the old man felt sorry for the lad and when he saw him pick up the pin decided it might mean a streak of good luck for him if he gave the boy a chance.

Another young man lost a fine business opportunity by carelessly misspelling a common five-letter word when writing his application for a position. The application was required by the prospective employer simply as a matter of record, for the young man had previously been highly recommended by influential friends.

The prospective employer evidently did not want to take on a possible liability. He knew from experience that one who is careless in little things cannot be depended upon to exercise care in performing tasks of greater importance.

preventionist, as a means of driving home to his listeners the enormity of our annual fire loss, pictured "A Street Of Desolation" by saying:

"The buildings burned, if placed on lots of 50-foot frontage, would line both sides of a street from New York to San Francisco. A person journeying along this street of desolation would pass in every quarter of a mile a ruin from which an injured person had been taken. At every third mile in this journey he would encounter the charred remains of a human being who had been burned to death!"

His word picture is not exaggerated. Any one of us could look at our watches for 60 minutes and, as each minute ticked itself away, we would be perfectly safe in saying: "Another fire has broken out; somebody's home or somebody's place of employment is being destroyed." And after our watch had ticked away for 24 hours we could say without a moment's hesitation: "1,440 fires have occurred in the last 24 hours, 55 persons have been injured and 27 persons have been burned to death."

"DEATH BY FIRE"—what sort of death could be worse? Those 10,000 humans, who become *human torches* each year, suffer deaths which are more horrible than mere words could ever picture.

Books tell us that thousands of years ago the people in Carthage worshiped a strange idol. When they wanted victory in war or wished good crops they offered sacrifices to their idol whom they called Moloch. Moloch was a huge figure, half man and half beast, cast in bronze. His hideous form covered a fiery furnace and into this the people hurled their most prized possessions—their own children!

Well, buddies, America does not worship a Moloch, but, by our own thoughtlessness, carelessness, lack of precaution and lack of common sense where fire is concerned, we are casting to the fire demon the lives of thousands of our good citizens, our homes, our buildings, our schools and our churches. We are making our sacrifice to the demon of FIRE just as the humble and misguided Carthaginians made their sacrifices to Moloch!

Tomorrow, October 6, "International Fire Prevention Week" starts. From October 6 through October 12 the American public will hear about fire prevention from many sources. Figures, such as I have given today, will be presented. Illustrations of what each individual can do to reduce the danger of fire, will be given. In many cities "fire prevention" campaigns will be started. Get into the work, buddies, and do your share to make your community safe from fire.

Well, I guess that I'd better get goin'. I'll be seein' you soon. Until then remember: "Matches have heads but they do not think. When you strike matches, your head has to do all of the thinking—so make sure you *put them out!*"

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Inter-Mountain Campaign Far Exceeds Expectations

In the recent "600" campaign of the Inter-Mountain Telephone Co., of Bristol, Tenn., the employes went "over the top" by 142 stations, surpassing the highest expectations of the company's executives. In a letter commenting upon the successful closing of the campaign, President W. N. McAnge, Jr., writes, in part, as follows:

"This campaign seems to me to be particularly remarkable in view of the fact that the four months—May, June, July and August—ordinarily are months in which we anticipate we shall make practically no gains, and generally losses, even in normal years."

With its "Flag of Victory" flying at full mast, the Inter-Mountain company's entire staff is justly proud of the fact that the company has again crossed its all time high of 16,255 stations with a total subscriber list of 16,403 stations as of August 31. The final result of the recent campaign was a gain of 742 stations, an average gain of 23.6 per cent during the summer months.

On January 1, 1932, the company crossed its former high. From that time on until the fall of 1933 a loss of 1,988 stations was experienced. In September, 1933, the company succeeded in putting a stop to the losses and nearly every month since that time, net gains have been recorded. With the sales campaign recently concluded, 2,136 telephone subscribers have been brought back into the fold.

Members of the Inter-State family are to be especialy congratulated for their excellent work in this campaign, launched as it was in the midst of the normally quiet summer season and directly upon the heels of an active drive by full-time solicitors in exchanges comprising 65 per cent of the company's entire list of subscribers.

IMPORTANT ANNOUNCEMENT

THE COST OF A COMPLETE EVEREADY AIR CELL BATTERY INSTALLATION HAS BEEN REDUCED FROM $11.90 TO

ONLY $6.97!

Made possible by the development of a more compact, lower-priced two-cell battery... and a new Single-Cell *battery*

The Improved, Lower-priced T-600 Eveready Air Cell Operators' Transmitter Battery. New low price, $4.17.

The New SINGLE-CELL T-300 Eveready Air Cell Operators' Transmitter Battery. Price, $2.80.

These two developments make Eveready Air Cell power for operators' transmitters the most economical obtainable. A former Eveready Air Cell installation consisted of two 2-cell batteries connected in series. This provided 5 volts... more than was usually required. The new installation consists of one 2-cell Eveready Air Cell and a single-cell Eveready Air Cell, connected in series. This combination reduces the cost of the installation considerably, yet provides the correct voltage range of 3.75 to 3.3 volts. The service life of the new installation is just as long as that of the old one. The two batteries, connected in series, will provide 6,000 hours of "peak" transmission at a cost of one cent per nine "talking" hours. In addition, the batteries require much less space than formerly. The new combination takes up a space only 15½" long, 6½" wide and 11" high.

Eveready Air Cell Operators' Transmitter Batteries not only answer the telephone manager's problem of "good service—low cost," but also do away with the nuisance of mixing messy chemicals, washing dirty jars, assembling renewal elements. They are shipped dry, and activated for service by merely filling with ordinary drinking water. For more complete information about these money-saving batteries, write National Carbon Company, or ask your telephone supply jobber.

NATIONAL CARBON COMPANY, INC.

GENERAL OFFICES: NEW YORK, N. Y. *BRANCHES:* CHICAGO, SAN FRANCISCO

UNIT OF UNION CARBIDE UCC *AND CARBON CORPORATION*

"Telephony's" Engineering Data

By B. C. BURDEN

Index, Cable Plant Construction.
Oct. 5, 1935.
No. 8-B, Page 10.

No. 22 B & S gauge (single, dry-paper insulation)

No. Pairs	Sheath Thickness	Outside Dia. (ins.)	Wt. per Ft.	Reel Lengths (ft.)
11*	.07	.44	.45	3,500
16*	.07	.48	.52	3,500
26	.07	.58	.67	3,500
51	.07	.73	.95	3,000
76*	.075	.87	1.27	2,500
101	.08	.99	1.58	2,500
152	.08	1.11	2.03	1,600
202	.085	1.33	2.55	1,600
303	.095	1.6	3.58	1,400
404	.095	1.78	4.28	1,200
455	.105	1.9	4.93	1,100
606	.115	2.61	8.5	650

No. 19 B & S Gauge (single, dry-paper insulation)

No. Pairs	Sheath Thickness	Outside Dia. (ins.)	Wt. per Ft.	Reel Lengths (ft.)
6	.07	.44	.45	3,500
11	.07	.53	.60	3,500
16	.07	.61	.72	3,500
26	.07	.72	.93	3,000
51	.075	.95	1.46	2,500
76	.08	1.14	1.98	1,800
101	.085	1.30	2.48	1,600
152	.09	1.56	3.37	1,400
202	.095	1.78	4.25	1,200
303	.105	2.15	5.98	900
404	.115	2.48	7.77	700
455	.115	2.61	8.46	650

*Not recommended for standard aerial cable construction.

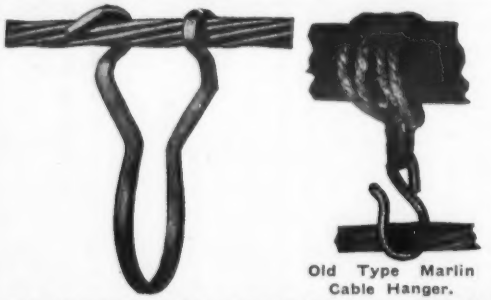

FIG. 4. NEW AND OLD TYPE CABLE SUSPENSION METHODS.

"Telephony's" Engineering Data

By B. C. BURDEN

Index, Cable Plant Construction.
Oct. 5, 1935.
No. 8-B, Page 11.

Suspension Strand

For suspending cable, only the best quality of messenger strand should be used, for the reason that strand which deteriorates quickly as the result of poor galvanizing or other factors, is expensive to replace. The strand should be carefully selected for ample strength and good galvanizing. Double galvanized strand is preferable, especially in industrial locations where there is much coal smoke or chemical fumes. Incidentally, strand should be given reasonable care and not dragged over rough or stony ground.

The following table gives the physical characteristics of a standard type of suspension strands used in supporting strand.

Type	Gauge of Wires	Diam. of Strand (In.)	Weight at Breaking Strength	Max. sizes of cable to be carried (pairs) No. 24 ga.	No. 22 ga.	No. 19 ga.	Max. Wt. Per Ft. of Cable Carried (Lbs.)
6,000-lb.	12	5/16	6,000	202	152	76	2¼
10,000-lb.	11	⅜	11,500	606	404	202	5
16,000-lb.	10	7/16	18,000	1212	909	455	8½

Cable Rings

Cable rings are designed to support lead-covered cable and are of the "snap-on" type; that is, they can be fastened to the strand merely by springing the hooked ends of the ring onto the strand. These rings are so constructed that they cannot jump off the strand, even under severe conditions. They are far easier to handle than the old type rings which had to be crimped on the strand by means of a special tool.

Fig. 4 illustrates the difference between the old type ring and a popular type of "snap-on" ring.

The size of cable ring to use in supporting cable depends on the size of the cable, the size of the suspension strand, and the make of the ring. In general, the inside diameter of the ring should be ½-inch to ¾-inch greater than the diameter of the cable supported. The following table gives more exact data:

CABLE (GALVANIZED OR COPPERWELD)

Size of Cable (Pairs) No. 24 ga.	No. 22 ga.	No. 19 ga.	Max. Cable Dia. (Ins.)	Size of Suspension Strand (Diam. in Ins.)	Size of Ring Stock (Ins.)	Ring Size (Diam. in Ins.)
11 to 101	11 to 101	6 to 76	1.14	5/16	7/64x13/64	1½
152 to 202	152	....	1.16	⅜ or 5/16	⅛x¼	2
303 to 606	202 to 404	101 to 202	1.78	7/16 or ⅜	⅛x¼	2½
909 to 1212	606 to 909	303 to 455	2.61	6/16 or ⅜	⅛x¼	3½

"Telephony's" Engineering Data

By B. C. BURDEN

Index, Cable Plant Construction.
Oct. 5, 1935.
No. 8-B, Page 12.

Placing Messenger Strand

Messenger strand is attached to poles by means of one-bolt suspension clamps (for light cable) or three-bolt clamps (for heavy cable). The clamps are fastened to the poles at the desired height (not less than ten inches from the top of the pole) by means of a ⅝-inch through bolt and nut.

It is the usual practice to place an additional nut between the clamp and the pole in order to provide clearance between the cable and the pole. If the placing of additional cable is anticipated at some future date, double-arming bolts should be utilized in order that the extra cable may be carried on the other side of the pole. Fig. 5 illustrates the method of supporting messenger strand on the pole.

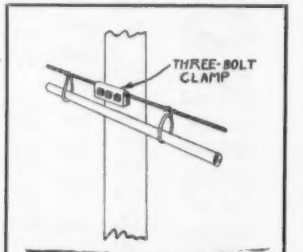

FIG. 5. METHOD OF SUPPORTING AERIAL CABLE.

With respect to clearance between the ground level and the cable, 20 feet is a satisfactory height, "though this may be altered by circumstances. For instance, trees may interfere with the routing of the cable. If they cannot be trimmed, it will be necessary to so place the messenger strand that the cable can be run under the heavy limbs. Local or state regulations with respect to clearances over streets, driveways, or railroads should be carefully observed.

If joint pole construction is used, the proper clearances should be maintained. For a discussion of these clearances, reference should be made to data sheet No. 6B, Pole Line Construction, November 7, 1931; or to Bureau of Standards Handbook No. 10, entitled "Safety Rules for the Installation and Maintenance of Electrical Supply and Communication Lines." The natural position of the messenger is on the street or road side of the pole lead as it is usually much easier to string the strand from this side.

The size of messenger strand to use should be determined from the table given under the physical characteristics of cable, strand, and cable rings. However, heavier strand than the size specified should be used if spans longer than normal are encountered.

A recommended method of stringing the strand is as follows:

The strand reel is placed on the axle of a cable reel and jacked up sufficiently so that it is free to revolve. A length of strand enough for an entire section is paid out and laid on the ground by the poles. The length to use depends a great deal on the terrain, the number of obstacles likely to interfere with the stringing of the strand, and the amount of street traffic encountered.

● **Here's a new Wire Grip by Crescent that *takes hold* and *hangs on* - yet *cannot* injure wire. Combines all the best features of Crescent's famous Buffalo Grips and Haven's Clamps and adds *many more*! Easily released by a flip of the rope. Absolutely jam-proof. Extremely lightweight for its capacity. Hook prevents it dropping from wire and injuring workmen below.**

All parts are of forged steel, heat-treated for uniform strength and finished in Cadmium Plate. Ask your supplier for the new Crescent Wire Grips. You'll find them equally efficient on bare or insulated wire. Two Sizes:

	Safe Load	*Weight*
No. 383-Max. Open'g ½" Min. Open'g 5/16"	5,000 lbs.	2 lbs.
No. 385-Max. Open'g 13/16" Min. Open'g 3/8"	10,000 lbs.	4¾ lbs.

CRESCENT TOOL COMPANY - - - JAMESTOWN, N. Y.

CRESCENT and Smith & Hemenway TOOLS

FIG. 4. NEW AND OLD TYPE CABLE SUSPENSION METHODS.

Modernizing Service Increases Subscribers

By D. B. CORMAN

District Manager, Kellogg Switchboard & Supply Co.

INTER-MOUNTAIN Telephone Co. Installs new equipment in Its Galax, Va., exchange. Improved service results in substantial gain in number of local subscribers

THE INTER-MOUNTAIN Telephone Co., with operating headquarters at Bristol, Tenn.-Va., and directed by W. N. McAnge, Jr., president, operates in 11 counties in southwest Virginia and east Tennessee, serving 25 cities and towns in that area.

For upwards of ten years this company has been most aggressive in its sales work, and has recorded some of the most unusual gains in stations in the industry. Its sales campaigns, with every employe a sales person, kept gaining stations right up through the year 1931, and on January 1, 1932, a new high in telephones in service in its territory was reached.

The world-wide depression, however, did not pass by the section in which the Inter-Mountain operates, and it suffered stations losses through 1932 and for three-fourths of 1933. In the face of these trying conditions, though, the company kept right on conducting these sales campaigns, and through the efforts of its people was able to confine the losses to a much lower percentage figure than the majority of other operating companies.

During the 21 months' period from January 1, 1932, until October 1, 1933, the company sustained a station loss of only 12.3 per cent, while on the other hand many other companies suffered losses well above 20 per cent of their peaks. Beginning with October, 1933, the Inter-Mountain company began to show gains of customers in its section and these have continued up to this time.

Not being content with the progress that was being made in the regaining of these lost stations by regular sales drives, other methods were decided upon. Looking in this direction, President McAnge, during the early part of 1934, called together his staff for the purpose of selecting an exchange that had promise of showing a nice station increase should there be a conversion to more modern and up-to-date central office and station equipment.

It was at this conference that Galax, Va., was selected. This is one of Inter-Mountain's more recent acquisitions, the property having been purchased and added to its system in 1929.

It was further decided that the best approach to promotion of the company's interests in Galax would be to have the business leaders come together as the guests of Local Manager H. M. Stultz, and at this meeting to have Mr. McAnge lay before these citizens the plans under consideration for the modernization of the exchange.

H. M. STULTZ, Local Manager of the Galax, Va., Exchange.

It was proposed to solicit their influence and support in helping Inter-Mountain to add to its subscription list, from which additions there would also accrue to them direct benefits. Mr. Stultz, a Rotarian, arranged to have this meeting fit right in with the regular weekly meeting of the Rotary Club, so there was a fine response to the invitation extended. It was at this meeting that the first move was made to improve telephone service in this community.

Galax, one of the picturesque towns of the Blue Ridge Mountains in the southwestern part of the state, was chosen for the reason that it is a fast-growing little industrial city. It was being served by magneto equipment, which, although in good condition and well-maintained, was not capable of giving the grade of telephone service that the Inter-Mountain company officials proposed to provide.

An order was placed with the Kellogg Switchboard & Supply Co. for a two-position, 6-800 Masterbuilt switchboard. This switchboard was equipped with 260 multiple line-lamp common-battery lines, 30 drop-signal magneto rural lines and 10 drop-signal toll lines. The first position was equipped with full universal cord circuits, having five-frequency machine ringing on common battery connections and five-frequency manual ringing on magneto connections.

The second position was equipped with full-feature common battery cord circuits having five-frequency machine ringing, keyless listening, secret service and instantaneous disconnect. A

The New Kellogg 6-800 Masterbuilt Switchboard Recently Installed in Galax, Va. The Improved Service Was Followed by a Substantial Subscriber Increase.

RAY-O-VAC

Adds CONVENIENCE to the Famous

FRENCH

TELEPHONE DRY BATTERY PAK

NOTE HOW EASY TO REPLACE

The convenience and economy of the *Plug-In*—first engineered and developed by Ray-O-Vac—now comes to the telephone field.

The Ray-O-Vac Plug-In eliminates the costly trips of service men to replace subscribers' telephone batteries. Now the batteries come in individual packages, ready to be *mailed* to the subscriber, who can easily make the change himself. Once the plug-in connections are made, replacement of batteries is as simple as plugging in any electric attachment. Anybody can change batteries—impossible to make a mistake. Think of the saving this will make for you in service costs alone!

Look at These Features:

1. **Mailable**—eliminate service trips.
2. **Compact**—require less room than ordinary batteries.
3. **Light weight**—weigh about half as much as two regular telephone cells.
4. **Simple connections**—anybody can do it—no chance to go wrong.
5. **Long life**—highest quality cells, scientific insulation and positive sealing insure long life and consequent low service-hour cost.

A NEW STANDARD OF VALUE FOR THE TELEPHONE COMPANY

For almost thirty years French and Ray-O-Vac Batteries have been recognized as the standard of quality in the independent telephone industry . . . the most economical batteries you can buy.

The outstanding quality of French Ray-O-Vac is now available in the *new type unit battery* especially designed for the telephone field where long life and compactness are essential. The size of these new batteries makes them particularly desirable for magneto desk sets and new type hand telephones where space is limited.

Be sure to see these new French Ray-O-Vac Batteries and specify Ray-O-Vac for dependable service-life and uniform high quality when ordering standard No. 6 cells or the new unit-type telephone battery pak. Available through independent telephone equipment companies and most established electrical houses.

Ask Your Jobber Salesman

RAY-O-VAC COMPANY • MADISON, WISCONSIN

(Formerly French Battery Company)

COOK

Terminals and Protection Has Faithfully Served Independent Telephony for More than 25 Years . . .

S-6 Protected Terminal

No. 7 Lightning Arrester

Substation Protector

Unprotected Terminal

MFG. BY

Cook Electric Co.

CHICAGO

calculagraph was provided for the toll operator on a shelf located on the cable turning section. Glass bulletin holders were provided on the keyshelves to supply smooth writing space, durable surfaces and a convenient, conspicuous place for traffic bulletins.

No more are the operators accused of not ringing, because the ringing starts automatically as soon as the selective key is operated, and continues intermittently until the called party answers or the calling party hangs up. Each time the called telephone is rung, the calling subscriber gets a tone or buzz in his receiver, which tells him that the operator has done her part and that the party he called is being rung. This feature is appreciated by the operator and the subscriber more than any other because it tells all about the call that is desired.

A special testing set was equipped in the face of the cable-turning section so that it would be possible for the chief operator to make outside line tests. This has proven a valuable unit of equipment, since there is not a wire chief constantly on duty to make line tests when there is some doubt as to the condition of a circuit. It is also very fine for assisting the troubleman, as the chief operator can make tests with him on the lines which are being inspected.

The commercial office and operating room are combined, thereby permitting the chief operator to serve as the business office clerk. This arrangement has also the advantage of getting the public to feel a more intimate relation with their telephone company. They see the equipment and the operators at work and learn that there is something else in the telephone system besides the instrument on their wall and the clerk at the desk who takes their money. They are taught that they are getting full value for their money.

The terminal room is located on the floor above the commercial office and operating room. Adjacent to the terminal room is a stockroom for telephone instruments and small parts.

The entire office is well kept and at all times makes an inspiring appeal to those who enter. One is always greeted by a courteous and friendly member of the Inter-Mountain family and is sure to leave feeling glad that he called at the telephone office.

The subscribers' instruments were all replaced with new common battery telephones in the local area, and most of the rural instruments were replaced with new magneto sets.

So much for the physical improvements to the Galax exchange, but you are, perhaps, wondering what increases were made in subscribers. With the arrival of the construction forces and office equipment people at Galax were several well-trained sales people. They were able, through the aid of Local Manager Stultz and the workers in that exchange, to increase tremendously the number of patrons being served by the new exchange equipment.

On June 1, just prior to the cut-over, there were 316 stations being served. At the close of the month, after the change had been made from magneto to full-feature common battery, and all new patrons secured added, there were 365—an increase for the month of 49, or an addition of 13.4 per cent. Since that time more additions have been made, and today this exchange is serving almost 400 customers.

H. M. Stultz has been the local manager in Galax since 1929. He is popular with the people of that area, is hard-working, and alert to serve his subscribers in every way possible at all times in order that his exchange may be second to none in telephone service. The Inter-Mountain company is very proud of the representation it is receiving in Galax through the local manager and his co-workers and for the splendid achievements they are attaining.

The results obtained at Galax by the Inter-Mountain company are proof enough that there is nothing to the bugaboo of those who do not believe in sales campaigns. If they are properly conducted, the business which is secured is permanent, profitable business.

COMING CONVENTIONS

United States Independent Telephone Association, Tower Room, Stevens Hotel, Chicago, October 8, 9, 10 and 11.

Independent Pioneer Telephone Association of the United States, Stevens Hotel, Chicago, October 10; Annual Luncheon.

Virginia Independent Telephone Association, October 31 and November 1, Richmond.

North Carolina Independent Telephone Association, Sedgefield Inn, Greensboro, November 4 and 5.

South Carolina Independent Telephone Association, Sumter, November 7 and 8.

The Illinois Telephone Association, Hotel Pere Marquette, Peoria, November 14 and 15.

Iowa Independent Telephone Association, Hotel Fort Des Moines, Des Moines, April 7, 8 and 9, 1936.

Ohio Independent Telephone Association, Deshler-Wallick Hotel, Columbus, April 22 and 23.

WELCOME to ROOM 2521 AT THE NATIONAL CONVENTION

Used for years on telephone, telegraph, railroad and lighting company distribution lines . . . a dependable source of supply for uniform, well-designed transparent glass insulators.

WHITALL TATUM CO.

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SEE HOW GLASS INSULATORS ARE MADE

Whitall Tatum cordially invites you to its room in the Stevens Hotel—October 8-9-10-11 to see in movie films how glass insulators and glass bottles are made. You'll find these films educational and absorbingly interesting, with many humorous high-lights.

You will witness the unusual scenes of years ago in the old hand shop of skilled artisans at the "Glory Hole". Then you'll see the contrast between these hand methods and modern automatic machinery. A revelation long to be remembered.

Room 2521 — Hotel Stevens, October 8-9-10-11.

WELCOME

While at the National Convention we invite you to inspect our exhibit of our complete line of CORDS, CABLES and WIRES.

Make our room your headquarters.

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Specialists in the Manufacture of Telephone Cords

1751 NORTH WESTERN AVENUE CHICAGO, ILLINOIS

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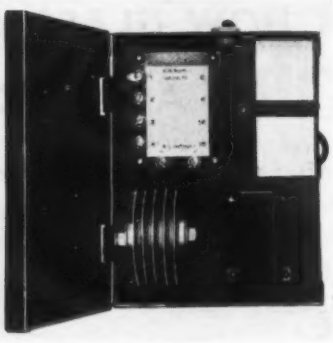
Power Supply RECTIFIERS FOR Telephone Service



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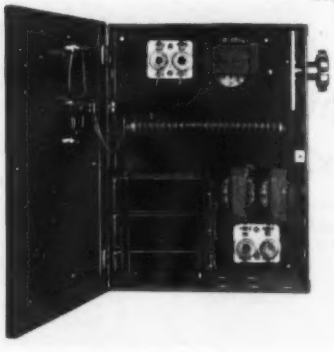
The most economical means for supplying current for the operation of telephone equipment.

Furnished for trickle charging storage batteries or for direct operation of telephone equipment without batteries. No hum.

ELECTROX Rectifiers use no acids, liquids, moving parts, or bulbs for rectification, therefore require no maintenance and the minimum of attention.



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A FEW OF THE MANY ELECTROX APPLICATIONS

As a battery eliminator for magneto operator's sets. (Type A-05004).

For operation of small intercom. telephone systems, dispatchers' telephone circuits, etc.

As a power supply unit (without batteries) for Manual or Automatic P.B.X. systems. (Type C-1024).

For trickle or cycle charging storage batteries in any kind of telephone service. Can be arranged to charge automatically to keep batteries at a fixed voltage.

Write for Bulletin No. 352

The Schauer Machine Co.
A. J. KOHN, Pres.
905-907 Broadway, Cincinnati, Ohio

Activities of Commissions and Courts

FCC Investigation of Bell; Engineer Appointed

The American Telephone & Telegraph Co. is giving the Federal Communications Commission only perfunctory cooperation in its $750,000 investigation of the system which Congress ordered last March, Commissioner Paul A. Walker charged on September 26.

Officials of the company are rendering "lip service," he said, but are hampering the progress of the inquiry by dilatory tactics. "They cooperate only when they have to," Mr. Walker said. "Their cooperation has been nothing to brag about. It amounts to little more than their giving us a particular document when we demand it."

Walter S. Gifford, president of the A. T. & T. Co., denied the charge.

"We are as anxious as the Federal Communications Commission to see the telephone investigation concluded," he said, "because large numbers of our people are engaged in assisting the commission's investigators and the cost is great. So far as we know, we are cooperating fully."

Mr. Gifford recalled his public statement of November 10, 1934, in which he said that "we have no skeletons in our closet to be exposed."

"We are primarily concerned with furnishing the people of this country with the best possible telephone service at the lowest possible cost consistent with fair treatment of employes and of those who have invested their savings in the business," he said at that time.

"We believe there is no conflict between our aims and the aims of the Federal Communications Commission, and we welcome the opportunity to place before that body all facts as to the manner in which our business is conducted."

Commissioner Walker listed these three principal questions which he expects the investigation to answer:

1. Is the Bell System overcapitalized?

2. Does it indulge in practices which, if corrected, might reduce rates to telephone users?

3. Are any of its operations detrimental to its stockholders?

"We are not out, trying to discover infractions of the law," Mr. Walker said. "The investigation is not going to develop anything sensational, at least during its preliminary part, but rather will reveal facts upon which we can build proper regulation of the telephone industry."

The accounting force of 120 men which the commission took on to go through the records of the company has been at work for more than a month, Mr. Walker said. The accountants and 23 engineers now are centering their work in New York headquarters of the company and in the Hawthorne plant of the Western Electric Co. A few are scattered elsewhere.

The commission on September 26 announced the appointment of Cyrus G. Hill of Chicago to direct the engineering phases of the A. T. & T. investigation. Mr. Hill was graduated from Yale in 1912 and took his degree as Master of Electrical Engineering at Harvard in 1914.

During 1914 he was employed in the factory of the Western Electric Co. and later that year was transferred to the central group of Bell Telephone companies in Chicago. This employment continued until Mr. Hill entered the army during the war. He spent nearly two years in France as an officer in the air service. In addition to his work as a pilot he reorganized the airplane shops taken over from the French and was in charge of radio communications for the second aviation instruction center near Tours.

Since 1919 Mr. Hill has been associated with the consulting engineering firm of J. G. Wray & Co. He has engaged in a large number of telephone investigations and rate cases, including the Northwestern Bell Telephone Co. in Minnesota, the North Dakota Independent Telephone Co., the Western Electric Telephone System of Iowa, the Indiana Bell Telephone Co., and the New York Telephone Co.

Mr. Hill also developed and presented testimony in the case of the city of Chicago vs. the Illinois Bell Telephone Co., which finally resulted in about 20 million dollars of refunds to the telephone subscribers of Chicago. He has been employed for some time as a public utilities engineer by the Wisconsin Public Service Commission in its statewide investigation of the Wisconsin Telephone Co.

Western Red Cedar Poles

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Quick Shipment from Idaho or Wash. Stocks

W.R.C.A.—A.T.&T.—N.E.L.A.
or A.S.A. Specn. Poles

STUBS **LOW PRICES** PILING

INSPECTION GUARANTEED
AT DESTINATION

B. F. VREELAND-Boston Bldg.-Denver, Colo.

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Douglas Fir Cross-Arms

FINEST LUMBER IN THE WORLD FOR
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Prompt Quotations Covering All Inquiries

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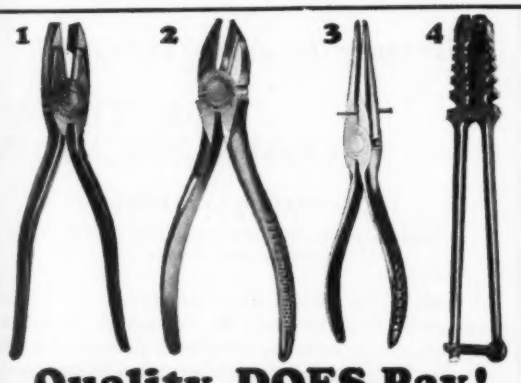
Boston Bldg., Denver, Colo.



Quality DOES Pay!

THESE four popular Vacuum Grip numbers prove the truth of the old saying that it pays to buy good goods. They outlast pliers of ordinary makes six to eight times—a *tremendous extra length of life—at a negligible extra cost.*

Vacuum Grip Quality *does* pay. Why not give it a chance to save money for *your* company?

1—LINEMAN PLIERS No. 58-R. Improved professional pattern. Tapered nose. Double bevel cutters. Insulation strippers. Length 8½"—$3.25.

2—HEAVY DUTY DIAGONALS No. 86. Most powerful cutters of their size. Hand filed, perfectly matched blades. Length 6"—$2.00. No. 87—7" (fashioned handles)—$2.50. No. 85—5"—$1.65.

3—LONG NEEDLE NOSE No. 196. Light weight heavy duty. Very popular with telephone electricians. Wire cutters; powerful grip. Length 6"—$1.85. No. 195—5"—$1.75.

4—LINEMAN'S SLEEVE CONNECTOR No. 12. Splices wire all sizes. Elliptical hole for guy strands. Locks tight; can't get out of alignment. Length 11½"—$4.50.

FORGED STEEL PRODUCTS CO., Newport, Pa.

Vacuum Grip Pliers

OVER A MILLION IN USE

BUILT UP TO A STANDARD — NOT DOWN TO A PRICE

PURCHASING AGENTS:

Ask us to quote special prices on lots of one-half dozen or more, for running tests. Write for particulars of our

30-DAY TRIAL OFFER

Cable

...and 60,000 other items

WHERE dependability counts—only the highest quality electrical products will do. One such quality product is Western Electric Lead Covered Cable—a cable whose dependability is insured by the most exacting of manufacturing standards.

But that's not all. Out of its roster of 60,000 electrical items Graybar is prepared to meet *any* need of a telephone industry. And behind *every* Graybar item stands the Graybar reputation for quality that goes back 66 years.

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OFFICES IN 77 PRINCIPAL CITIES
EXECUTIVE OFFICES: GRAYBAR BUILDING, NEW YORK, N. Y.

The engineering organization of the telephone investigation will continue as a part of the regular organization of the engineering department of the Federal Communications Commission, and Mr. Hill will assume the duties in connection with directing the work of the investigation formerly assigned to W. G. H. Finch, who recently resigned.

• • •

Unclaimed Refunds to Be Paid to City and County

The Associated Ohio Telephone Co. has been ordered by Federal Judge Benson Hough to pay $3,397 to the city of Marion, Ohio, and $69 to the Marion county treasury. The sum represents the money the company was unable to distribute in rate refunds because it could not locate some of the recipients.

• • •

Hearings Continue in Alabama Rate Case

When the hearings were resumed on September 24 before the Alabama Public Service Commission in the Southern Bell Telephone & Telegraph Co. rate investigation, Horace Wilkinson, counsel for the city of Birmingham, closed his case unexpectedly without calling a witness. In support of Birmingham's petition, similar to that of the state, for a 40 per cent reduction in rates, Mr. Wilkinson had offered a series of affidavits and 20 documents.

Included among the latter was a "breakdown" on the Birmingham exchange showing that, although industry generally had been operating at a loss in Birmingham since 1930, the telephone exchange showed a return of 3.87

Answers to Traffic Questions on Page 31

1. If the distant operator attempts to pass an IN ticket, or to pass a report relating to a delayed call which is being handled by long distance, ask the distant operator to ring again, and reach your toll center.
2. The day station-to-station rate, which is the rate in effect when conversation takes place.
3. Advise the calling operator that the called number is a non-published telephone. It should be explained to the calling party that the called party has a telephone, giving the address, but that he has requested the telephone company not to give out his number, and that unless the calling party is able to furnish the number, the operator will not be able to connect him.
4. Give the report to the calling station, saying, for example: "They will not accept the charge. Will you pay for the call?" If the calling party agrees to pay for the call, enter "ag paid" in the space for reports, draw a line through "col."; advise the called party that the calling party will pay for the call and proceed as on a paid call. Understand that the classification of the call does not change. If the calling party declines to pay for the call, say "All right, sir"; advise the called party that the calling party has cancelled the call; clear the toll circuit, enter "ca (time)" on the face of the ticket at the top, and draw a line through "col." If the rate is 20 cents or more, understand that the call is classified as a person-to-person call, print "P" in the called person space and underline the report received from the called station.
5. No.

A World-Wide

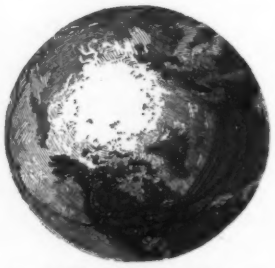
"HOOK-UP" *for Independent Companies!*

...via telegraph, cables and radio

● In hundreds of cities and towns, Independent Telephone Companies now offer world-wide telegraph, cable and radio service to subscribers *direct from their telephones.*

To provide this far reaching service, these Companies have adopted the "Postal Telegraph Plan," which makes their networks—no matter how large or how small—a definite part of the great International System of coordinated communication facilities.

Today . . . . wire collect or write for information about the "Postal Telegraph Plan."



Postal Telegraph is the only American telegraph company that offers a world-wide service of coordinated telegraph, cable and radio communications under a single management. Through the great International System of which Postal Telegraph is a part, it reaches Europe, Asia, The Orient over Commercial Cables; Central America, South America and the West Indies over All America Cables; and ships at sea via Mackay Radio.

THE INTERNATIONAL SYSTEM

Postal Telegraph

Commercial Cables · All America Cables · Mackay Radio

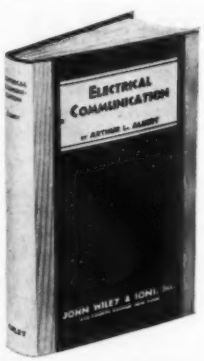
Discusses the entire industry!

ELECTRICAL COMMUNICATION

By ARTHUR L. ALBERT

Associate Professor of Communication Engineering, Oregon State College

A study of the various specialized phases of electrical communication as related to the usages of modern communication systems. This book presents not only theory but a discussion of the entire industry. Although not highly mathematical, the treatment is exact, up-to-date, and in accord with the highest engineering standards. The communication engineer will find this book a valuable addition to his working reference library.



448 Pages 6 by 9

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TELEPHONY PUBLISHING CORPORATION

Telephone Wabash 8604 608 S. Dearborn St., Chicago

per cent on an $11,583,827 investment in 1934.

Counsel Wilkinson offered sections of the commission's 1933 hearing which resulted in a rate reduction against the Southern Bell as part of the current hearing's record, but when Ed Smith, telephone counsel, objected, the commission took the introduction of the sections of the 1933 record under consideration.

Resuming his testimony the following day, Mr. Wilkinson declared that the Southern Bell, in 22 years of operation in Birmingham, had a depreciation reserve and expense expenditure greater than its total investment.

The state and the city of Birmingham having rested their cases on direct testimony, the Southern Bell, on September 25, recalled the witnesses for cross-examination and had Victor Gough, rate expert for the state, on the stand when the session was recessed until Thursday, September 26.

Long and sometimes heated discussions arose between company counsel and Attorney General Albert Carmichael, representing the state, over the amounts being paid the seven expert witnesses of the state. A letter from Mark Wolff, public service consultant and chief of the state witness corps, was finally submitted. In addition to indicating certain prices to be paid for daily service of experts, the estimate was given that the over-all expense to the state would be around $25,000.

At the hearing on September 27, Hugh White, president of the Alabama Public Service Commission, criticized Thomas Hails, rate expert for the city of Birmingham, for not showing due diligence in preparing Birmingham's case. The criticism came when Mr. White, speaking for the commission, overruled the request of Mr. Wilkinson for detailed data from the telephone company covering the Birmingham exchange.

George Call, state witness and expert accountant, upon cross-examination, said he had testified on direct examination that he did not believe there would be any material gain in bond yields during the next two years. This comment was not permitted to go into the record of the case, but a direct quotation from the Standard Statistics Co., which appeared in a daily column written by John Temple Graves, II, in The Birmingham Age-Herald of September 26, predicting a general recovery and expansion of business in the near future, was admitted into the record.

After recessing the hearing until October 4, immediately following its ruling on motion of city of Birmingham to require the Southern Bell company to furnish certain information, the commission gave out the following statement:

"In our ruling on this motion, the

(*Please turn to page* 51.)

Crapo
GALVANIZED PRODUCTS

Lower Maintenance Costs

Crapo Galvanized Telephone Wire and Steel Strand can be spliced and served without injury to the galvanizing. The heavy, uniform, *pure zinc* coating, applied by the *Crapo* Patented Process, is so adherent and so ductile that it defies sharp bending and twisting. This insures corrosion-resisting joints, adds to the life of the wire and actually reduces maintenance costs .... Specify genuine *Crapo* Galvanized Steel Strand and Telephone Wire for all new and replacement work! They more than meet the most rigid specifications. . . . .

Indiana Steel & Wire Company
Muncie, - Indiana

Crapo Galvanized Steel Strand is first choice of leading utilities both for guying and for messenger cable. Photo from Peoples Telephone Co., Butler, Pennsylvania.

Telephone Wire • • Steel Strand

★ *An Invitation*

Delegates to the U. S. Independent Telephone Convention are cordially invited to visit The Lakeside Press during their stay in Chicago.

During more than 40 years of telephone directory making, The Lakeside Press has developed an unusual organization for handling all of the details of this specialized branch of the printing business.

THE LAKESIDE PRESS

R. R. Donnelley & Sons Company

350 EAST TWENTY-SECOND STREET, CHICAGO, ILLINOIS

The Manufacturers' Department

Manufacturing Glass Insulators and Bottles

As users of glass insulators, telephone men will be interested in a booklet recently published by the Whitall Tatum Co., of New York City, on the subject, "How Bottles Are Made." Elizabeth M. Bacon is the author of this fascinating story of the growth and development of a century-old glass manufacturing business.

This pamphlet has been printed in conjunction with the company's 16 millimeter silent motion picture films on glass making. During the past year these films have been shown before schools, civic and social organizations and other assemblages throughout the country, and have created much favorable comment. Telephone men will have an opportunity of viewing the films in the exhibit room of the Whitall Tatum Co. at the national convention in Chicago next week.

The attractive, illustrated booklet entitled, "How Bottles Are Made," contains 16 pages, approximately 5½ ins. by 8½ ins. in size, and relates the story of the long and slow evolution of glass production from the first crude glass beads and bottles made by the Egyptians to the beautifully-designed bottles of today, turned out in mass production by modern, automatic processes.

In 1806, the story relates, the first glass factory was erected in Millville, N. J., and on this same site one of the Whitall Tatum factories now stands. Not until 1900 did automatic machinery have any appreciable effect on glass production. Until that time, the same basic methods used by the Egyptians were still in use. In the past 35 years more progress has been made than in all of the preceding centuries.

Glass insulators, which play an important part in the undistorted and uninterrupted transmission of voice currents over telephone wires, are made completely on automatic machines. Unlike bottles, however, which are pressed and blown, glass insulators are pressed only. The operation calls for a set of moulds where a thread is pressed inside. When fully formed, the insulator is removed by automatic hands and placed on a conveyor, by means of which it travels through a mechanical oven known as a lehr, is annealed, cooled and delivered to the packing and shipping room.

For generations the Whitall Tatum Co. has made high-grade telephone insulators by the tens of thousands, and they are in use on telephone and telegraph lines all over the country. They are made of exceptionally durable glass to withstand the extremes of temperature to which they are subjected and to prevent current leaks.

• • •

Method of Charring Virginia White Cedar Poles

October days bring a message of the coming winter and remind companies that they should take advantage of the best working season of the year to repair, replace and strengthen their lines of communication for the storms which the winter is sure to bring.

The national Independent telephone convention will bring together a large number of Independent telephone men for the discussion of practices in line construction and maintenance.

It has been proved by practical experience that the old-fashioned method of charring poles at the ground line is of considerable benefit in protecting the pole at the point where it changes from moist to dry. Jordan Brothers Lumber Co., Norfolk, Va., has improved the old-fashioned method of charring in an open fire by adding a treatment while hot of creosote oil and tar. This treatment is said to be economical and effective, increasing the value of Virginia white cedar poles.

• • •

New Pliers Catalog by Forged Steel

An unusually attractive catalog just issued by the Forged Steel Products Co., Newport, Pa., illustrates that company's well-known line of vacuum grip pliers.

Front Cover and General Appearance of New Catalog of the Forged Steel Products Co.

Of particular interest to those in the telephone field is the group of lineman pliers and diagonal cutters for electricians, embodying many special features designed to add to the comfort and speed of the user in all classes of work.

Large illustrations effectively show the details of construction and special features of the various pliers and other tools made by the company.

• • •

L. E. Morier Makes New Connections

Laurence E. Morier, who has been connected with the cedar pole business in various capacities for the past 30 years, is now affiliated with the Brown Wood Preserving Co., of Louisville, Ky., as vice-president and sales manager.

During his 17 years' association with the Naugle Pole & Tie Co., Mr. Morier acquired a wide range of valuable experience. Starting in the capacity of timekeeper and assistant foreman in the Chicago yards in 1905, he was transferred, three years later, to the company's Minnesota plant in the capacity of assistant superintendent of operations.

He was later recalled to Chicago and transferred to the sales end of the business. His practical experience in the pole-producing business, together with his sales ability, fitted him particularly well for his new work. In fact, so suc-

BE sure to see the Le Carbone Air Depolarized Dry Cell, for telephone, telegraph, and signaling service — at the convention—

ROOM 2537 .. STEVENS HOTEL

LE CARBONE COMPANY
General Offices and Works, Boonton, N. J.

LE CARBONE
Air Depolarized
CARBON CELL

cessful were his sales endeavors that the company decided to open up an eastern office in Columbus, Ohio, and placed him in charge.

About 1923 he became district sales manager for the Page & Hill Co., of Minneapolis, Minn., with whom he was associated during the ensuing nine years, with offices at Dayton, Ohio. In 1932 he joined the sales organization of MacGillis & Gibbs Co. in a similar capacity, retaining his headquarters in Dayton.

His many friends in the telephone industry, particularly east of the Mississippi River, will be glad to learn of Mr. Morier's affiliation with the Brown Wood Preserving Co. with offices in Louisville, Ky.

• • •

New Ohio Representative of MacGillis & Gibbs Co.

H. W. Mitchell is now representing the MacGillis & Gibbs Co. in the sale of cedar poles and other lumber products in the Ohio-Michigan and Pennsylvania territory. Mr. Mitchell, who succeeds L. E. Morier, resigned, has offices at 17 So. High St., Columbus, Ohio.

• • •

New Catalog Issued On Gray Pay Stations

"Gray Telephone Pay Stations, Yesterday, Today, Tomorrow" is the theme of a handsome new catalog which has just been issued by the Gray Telephone Pay Station Co., of Hartford, Conn. The volume contains nearly 200 pages, approximately 7½x10½ inches in size, replete with fine illustrations and is bound in a most attractive cover of slate gray.

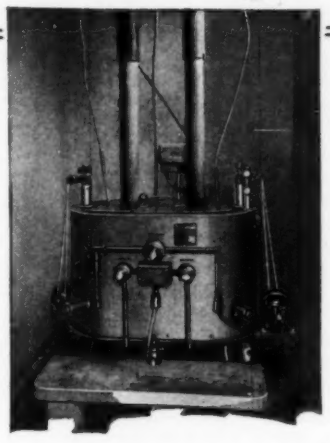
As stated in the introduction, the book is intended to introduce and describe the company's latest developments in pay stations and to make clear the wealth of practical experience and long years of experimentation which have made the Gray pay station of tremendous importance in the telephone industry.

The catalog presents a survey of the company's background from its inception, as an idea in the mind of one man, William Gray, inventor of the pay station, on through the phases of its national and worldwide development, and a brief forecast of what the future holds in store.

A biographical sketch is presented of George Alexander Long, president and general manager of the Gray Telephone Pay Station Co., who has devoted practically his entire life to the development and perfection of the pay station.

While serving an apprenticeship in the factory of the famous Pratt & Whitney Co., Hartford, Conn., the young lad of 16—after several trials and much

Bomb Aged and Tested



WB

Telephone buyers who purchase wire on a cost per year basis will be interested in our "OXYGEN BOMB" aged wire, a reliable means in conjunction with physical tests, of approximating the life of rubber insulation. In the "OXYGEN BOMB" the Whitney Blake insulated conductor is subjected to oxygen at extremely high pressure for days at a temperature much higher than encountered in service.

Telephone Wire

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COPPERWELD - BRONZE
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MANUFACTURED BY

The Whitney Blake Co.

SOLE SELLING AGENTS IN U. S. A.

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FOREIGN DISTRIBUTORS: *International Standard Electric Corporation*, 67 Broad St., N. Y. C.

The Gas Alarm!

Every tiny, pin-point leak—regardless of its cause—gives instant warning in the local wire chief's office when AIRCO Oil-Pumped NITROGEN (Dry) is used to keep both underground and aerial telephone cables under pressure. The moment the pressure drops a warning alarm is set off. The trouble can be located quickly and repairs made before the entrance of moisture puts the telephone lines in the cable out of order.

For over ten years, AIRCO Oil-Pumped NITROGEN has been successfully used to lower cable maintenance costs, reducing or eliminating entirely interruptions in service from water entering the cables.

Write TODAY for leaflet explaining the NITROGEN method for testing and maintaining telephone cables.

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An exclusive line of expanding Guy Anchors in two-way . . . three-way . . . and four-way types. All of Certified Malleable Iron.

Preferred by leading telephone and utility engineers. Extra "holding power" due to structural features of the Everstick Anchor . . . extra strength due to Certified Malleable Iron . . . these advantages enable Eversticks to stand up under the terrific strain of unusually tough wind and weather conditions. Write for latest Everstick Bulletin.

EVERSTICK ANCHOR CO.
Main Office and Plant
FAIRFIELD, IOWA

Telephone Lineman pulling overhead Guy Wire with Model A Coffing Hoist

These hoists are easy to use in any position.

Capacities: ¾, 1½, 3 and 6 ton.

Weights: 14, 25, 34, 65 lbs.

Coffing Hoist Co.
313 E. Van Buren St.
Danville, Ill.
Tel. Main 491

labor—constructed a practical pay station machine from the crude models made by William Gray.

In 1901 Mr. Long associated himself with the Gray company and was made its directing head. In the succeeding years he has devoted himself to the development of the pay station. To him more than any other man is due the credit for the efficient instruments of today.

In presenting "A Forecast of the Future" the catalog tells of the company's experiments with the mercury switch as a method of lengthening the life and increasing the effectiveness of pay station relays. The device now in use, depending upon a pair of palladium-tipped nickel silver leaf springs, has proved a source of potential trouble.

The mercury switch consists of a glass tube containing a small quantity of mercury and an inert gas. Two contacts sealed into one end of the tube serve to carry the electrical connections into the pool of mercury. Strips of spring phosphor bronze are used to suspend the mercury tube on the relay in an approximately horizontal position so that the mercury flows away from the contact points.

When a coin is deposited it passes through the coin chute, tripping a trigger and releasing a switch lever. This presses down on the phosphor bronze springs and tilts the mercury tube causing the mercury to bridge the contacts.

As soon as a switch at the central office is released the mercury switch at the pay station will return to the horizontal position in readiness for the next call.

The volume also contains reproductions of photographs taken in the company's factory in order to give its customers an idea of the modern equipment used in the manufacture and testing of Gray pay stations.

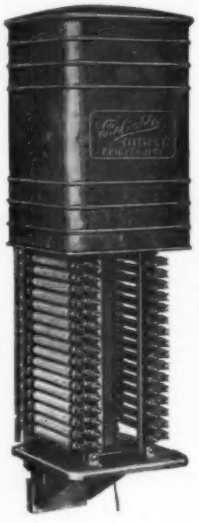
The present line of Gray pay stations, described and illustrated in the catalog, includes prepayment models for manual or machine switching service, sidetone reduction or anti-sidetone circuits, standard or handset instruments, and convertible models for those companies which now operate postpayment but will eventually change over to prepayment service.

The work at the plant of the Gray Telephone Pay Station Co. is not confined strictly to telephone pay stations, but includes the development of other types of toll apparatus. One such device, known as the "Long Writograph," is a combination of the conventional pay station with a device for sending the written word over telephone wires. With this device, which is covered by United States patents, the message is not typed as is the case with teletype service, but is written in longhand. Thus the signature of the sending party is just as authentic as it would be on a letter sent through the mails.

• • •

Reliable's New All-Metal Cable Terminal

The Reliable Electric Co. has developed a new all-metal protected cable terminal incorporating original and important features. The illustration on this page shows its appearance and features.



View of New All-Metal Cable Terminal, Showing Fuse Arrangement and Provision for Mounting on Pole.

The bracket is detachable for separate mounting on the pole and is so constructed that it holds the terminal close to the pole and prevents it from tipping. Pole gaining is unnecessary. Lag screws for mounting are supplied with each terminal.

The cover is square shaped, weatherproof and heavily galvanized, with a cast top which will not bend under the weight of a lineman. A spring catch holds the cover in any raised position, and its center guide prevents it from touching any live parts.

The terminal has been turned around, placing the cable chamber, or permanent part, against the pole. This allows perfect visibility and accessibility for drop wiring and testing at the front of the terminal.

Carbon springs and fuse clips are independent of each other. Ground blocks are set at right angles to the fuses and can be easily inspected. All fuse clips and springs are made of high-strength bronze with rounded edges to prevent scratches.

The binding posts cannot be turned and are treated to prevent season cracking. Beveled washers on each binding post are easily separated. Jumpers can be mounted without removing the fuses.

The cable chamber is cast for permanency with ample room for cable. Cable

binding posts are seated in molded bakelite. The cable chamber is sealed with a one-piece rubber gasket and heavy metal plate.

The B27 terminal accommodates a standard 4¾-inch pencil type fuse. The B55 accommodates the Reliable No. 55 cutted-end fuse, and the B56 accommodates the Reliable No. 56 threaded-end fuse, all standard terminal fuses.

Pioneer Wire Sales Engineer Dead

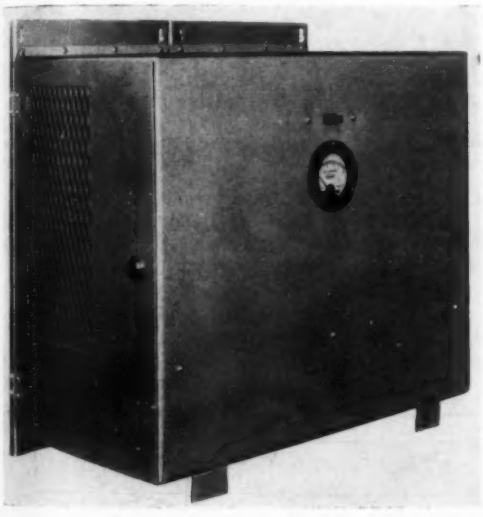
WILLIAM H. SLINGLUFF, 57 years old, for nearly 25 years sales engineer in Chicago of John A. Roebling's Sons Co., and in recent years district manager of the American Chain Co. in Chicago, passed away at his home in Oak Park, Ill., on September 10.

Mr. Slingluff had been in the wire, rope and chain business in Chicago since 1900. He was a charter member of the Independent Pioneer Telephone Association of the United States, and was well acquainted with many Independent telephone men through his years of association with the Roebling company.

His widow and six daughters survive.

North Electric's New Self-Regulating Battery-Charging Equipment

A NEW self-regulating automatic battery charging equipment has been developed by the North Electric Mfg. Co. of Galion, Ohio, which, it is stated, will hold the system voltage to within a three-volt range. The self-regulating automatic control equipment can be used in conjunction with any type of rectifying equipment.



View of Wall-Mounted Battery Charger Now Available to Operating Telephone Companies Operating Small Exchanges.

Telephone equipment manufacturers have devoted a considerable amount of attention to the problem of producing suitable power equipment for telephone exchanges. Different types and arrangements of equipment have been tried with varying success. Many types of charging control have been experimented with.

The North company has long been interested in the development of power equipment for the smaller exchange field because the all-relay switchboard had reached a point where it could be locked up and left alone to work unattended and without routining for long periods of time. Consequently the need for an automatic power supply was evident.

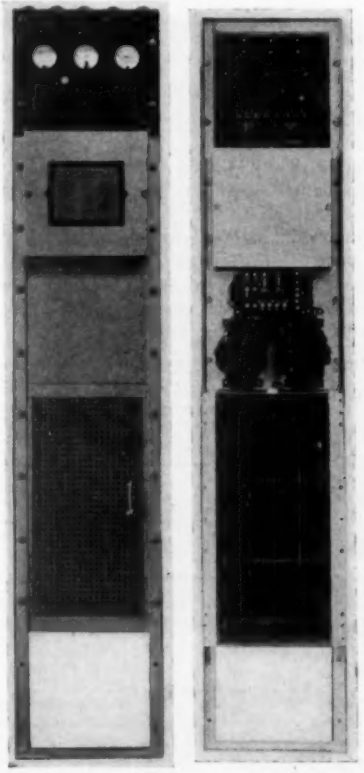
The first consideration was the reliability of the source of direct current supply. Many different types of rectifying devices were studied, as improved designs were made available, to determine their suitability for use in unattended exchanges.

The new North charger includes a regulating device which measures the load of the system and supplies an equal current input whenever a load is placed on the battery. The charger floats across the battery, and the battery gives the usual cushioning effect. The battery also acts as a standby or emergency source of power in case of a failure of the commercial current.

The new self-regulating charging equipment has been in use in the field for a trial period and has proved successful. Many operating companies have already replaced old-style charging equipment with these new units.

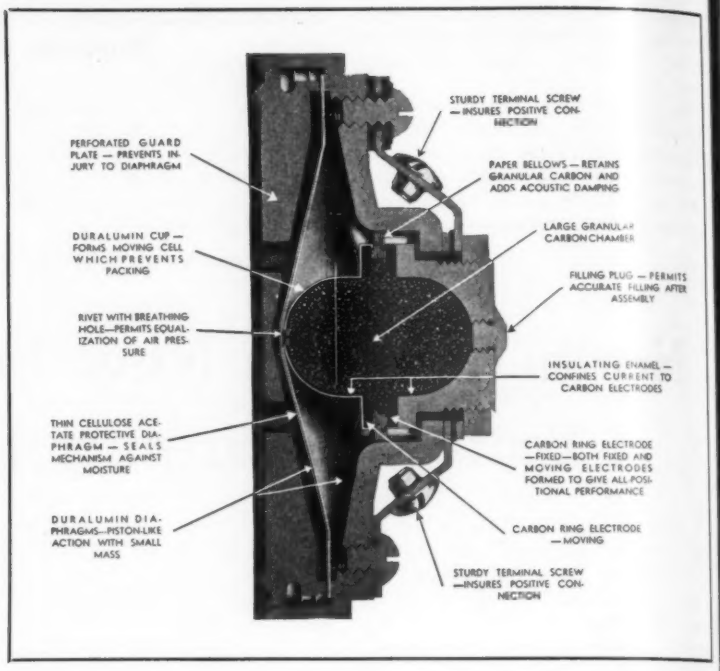
While these units were designed primarily to fill the need of the unattended automatic exchange, their use is by no means limited to automatic exchanges. They can be used wherever the constant float battery method is required or could be used to advantage.

The new charger is sold only by the North Electric Mfg. Co., Galion, Ohio. It will be shown in the company's exhibit at the convention next week.



Front and Rear Views of Rack-Mounted Charger Recently Developed by the North Electric Mfg. Co.

Fig. 1. Exterior and Cross-Section Views of Automatic Electric Co.'s New Monophone Transmitter. The Exterior View Is Approximately Three-Fourths the Transmitter's Actual Size.

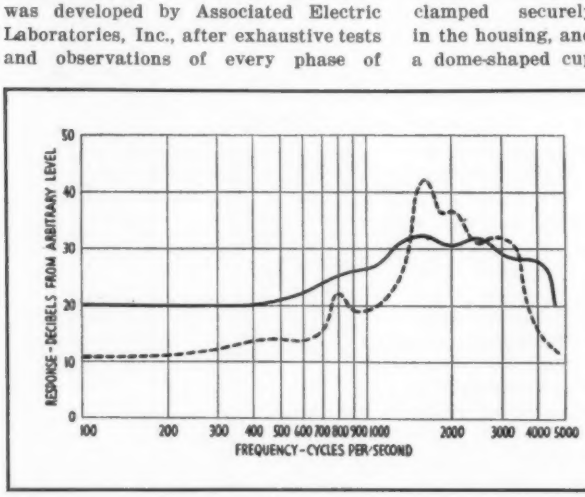

STURDY TERMINAL SCREW — INSURES POSITIVE CONNECTION
PERFORATED GUARD PLATE — PREVENTS INJURY TO DIAPHRAGM
PAPER BELLOWS — RETAINS GRANULAR CARBON AND ADDS ACOUSTIC DAMPING
DURALUMIN CUP — FORMS MOVING CELL WHICH PREVENTS PACKING
LARGE GRANULAR CARBON CHAMBER
FILLING PLUG — PERMITS ACCURATE FILLING AFTER ASSEMBLY
RIVET WITH BREATHING HOLE—PERMITS EQUALIZATION OF AIR PRESSURE
INSULATING ENAMEL — CONFINES CURRENT TO CARBON ELECTRODES
THIN CELLULOSE ACETATE PROTECTIVE DIAPHRAGM — SEALS MECHANISM AGAINST MOISTURE
CARBON RING ELECTRODE —FIXED—BOTH FIXED AND MOVING ELECTRODES FORMED TO GIVE ALL-POSITIONAL PERFORMANCE
DURALUMIN DIAPHRAGMS—PISTON-LIKE ACTION WITH SMALL MASS
CARBON RING ELECTRODE —MOVING
STURDY TERMINAL SCREW —INSURES POSITIVE CONNECTION

Automatic Electric Co.'s New Telephone Transmitter

AMERICAN Automatic Electric Sales Co., distributor for products of Automatic Electric Co., Chicago, has just announced the development of a new transmitter of vastly improved design, for use in its Monophone handsets. This transmitter, Fig. 1, known as type 35A7, was developed by Associated Electric Laboratories, Inc., after exhaustive tests and observations of every phase of transmitter design and construction.

The housing of this new transmitter is of aluminum alloy, providing a rigid but light-weight mounting for the working parts. The moving system, of duralumin sheet, is made of three parts—two shallow cones placed back to back and clamped securely in the housing, and a dome-shaped cup which is riveted to the front cone. This forms a diaphragm assembly which is stiff in the center and flexible around the outer edge, and which, therefore, moves as a whole, a movement similar to that of a piston.

A carbon ring electrode is fastened on



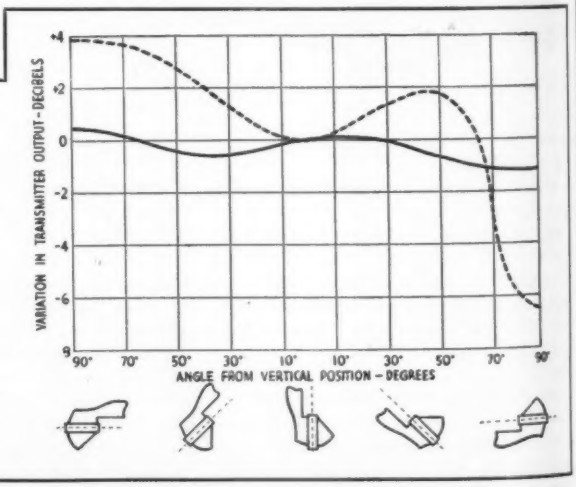


Fig. 2. Solid Line Curve Shows Higher and More Uniform Response of the New Transmitter, at Various Frequencies, as Compared With That of the Former Transmitter. Fig. 3. Solid Line Shows the Improved Uniformity of Output When the Handset Is Held at Various Angles.

the edge of the dome-shaped carbon cup, and moves with it.

Opposite this moving electrode is another carbon ring electrode, which is fixed to the transmitter housing but insulated from it. A dome-shaped carbon cup is provided in the housing. This cup, as well as the moving cup, is lined with insulating enamel, so that all current between terminals must pass through the carbon electrodes.

Between the outer edges of the ring electrodes is cemented a paper bellows, which confines the granular carbon, and which also serves to force air into the chamber back of the diaphragm when it moves, thus damping or controlling its vibration.

A moisture-proof protective diaphragm of cellulose acetate is provided over the main diaphragm, and all joints of the transmitter are made moisture-proof. The transmitter, it is stated, can be immersed in water for a considerable length of time without impairing its performance.

The shape of the carbon cups in this new transmitter assures that the pressure due to gravity on the carbon granules is nearly constant for all positions in which the transmitter may be held. This results in the uniform "all-positions" performance shown in Fig. 2.

The volume of carbon being large, its resistance is low, and the "heating up" under the flow of current is minimized, practically eliminating "frying" noises. A small air vent is provided to permit air to escape from the interior of the carbon cell into the space behind the protective diaphragm, thus preventing "breathing."

The form of the cell walls, also, is such that heating increases the size of the cell, and reduces the pressure on the carbon. As the front half of the carbon cell is carried directly on the moving diaphragm, any movement of the diaphragm moves the carbon granules, and prevents "packing."

The high degree of fidelity of transmission produced by this new transmitter, in comparison with the former Monophone transmitter, is clearly shown in Fig. 3. The new transmitter (solid curve) responds well up to 4500 cycles, and has considerably less variation in response.

The type 35A7 Monophone transmitter is interchangeable with previous Monophone transmitters without the use of adapters.

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COMMISSION AND COURT ACTIVITIES

(*Continued from page* 45)

ommission expressed the view that the city's expert, Thomas J. Hails, employed by the city in this case, had shown a lack of diligence in making efforts to obtain information desired by the city.

The commission has no desire to do Mr. Hails an injustice. It may well be he has exercised due diligence but that his work has not come before the commission, and the commission's formal ruling will accordingly be amended to strike out the commission's expressions as to this matter."

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Cash Deposit Requirement Under Examination

The Indiana Public Service Commission is examining a clause in a list of supplemental charges filed by the Indiana Bell Telephone Co., which provides that any subscriber or applicant, whose financial standing is doubtful, shall be required, on demand of the company, to make a cash deposit equivalent to three months' charges.

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Asks Rehearing On Washington Rate Ruling

The Washington State Supreme Court has been asked to reconsider its recent decision invalidating a 1933 law authorizing the Washington Department of Public Service to assess costs of its rate and valuation cases against the utilities. The decision (TELEPHONY of September 7) dealt a virtual death blow to the department's statewide power, water and telephone rate cases, depriving it of its main source of revenue.

In its petition the department contends the state supreme court misstated the facts in its ruling.

The department denied it had discriminated against utilities by failing to assess costs against smaller utilities.

Reopening of the case is sought on the ground the court erred in construing the Washington act as different from the Wisconsin and New York state acts, one of the main points on which the court hung its invalidating decision.

The Washington law, the court declared, permitted the department to proceed against utilities without any limitations, while the laws of the other two states imposed restrictions.

The department, Director Ferd Schaaf said, contends that the Washington and New York acts are exact copies of the Wisconsin law, and that both the New York and Wisconsin measures were upheld by the courts.

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Commission Rulings and Schedule of Hearings

ALABAMA.

October 4: Hearings resumed in the matter of the investigation into rates and charges of the Southern Bell Telephone & Telegraph Co. in which the state, as well as the city of Birmingham, is asking for a 40-per cent reduction in rates; continued to this date from September 27.

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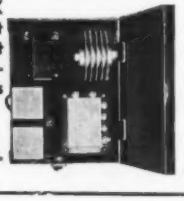

MISSOURI.

September 23: Approval granted application of the Central Missouri Telephone Co. to discontinue its switchboard at Lilly, Clinton county. Service will be rendered subscribers at Lilly through exchanges at Holt or Kearney.

September 24: Joint application approved of the Western Telephone Corp. of Missouri to sell and D. W. Mason to purchase the Indian Grove Telephone Exchange, located at Indian Grove.

October 7: Hearing in Jefferson City on joint application of Arthur Rice to sell and the Ironton-Arcadia Telephone Co. to purchase the telephone exchange in Ironton-Arcadia, and Pilot Knob for the Ironton-Arcadia company to issue 500 shares of stock.

NEBRASKA.

September 17: In the matter of the application of the Chester Telephone Co. for authority to issue $10,000 stock; hearing held, evidence adduced and application taken under advisement.

September 17: In the matter of the informal complaint of Joe Soukup and others against the Walnut Grove Telephone Co., relating to service; dismissed without prejudice to new complaint.

September 17: In the matter of the informal complaint of Farmers Independent Telephone Co. against the Citizen Telephone Co.; dismissed without prejudice to filing of new complaint.

September 17: In the matter of the application of the Dundy County Mutual Telephone Co. for authority to waive installation charges between September 20 and October 31, inclusive; found reasonable and granted as asked.

September 17: Permission given the Tri-County Telephone Co., of Wolbach, to charge the following schedule of net rates: Business, $2.25; residence, $1.25; farm, where paid monthly, $1.50, and where paid annually, $16; night emergency service to be given free, but where night calls are not of that character a charge of 10 cents. The company recently purchased the exchange from Ole Christiansen.

September 21: It appearing to the commission that there is no longer any demand for the service, it is ordered that the Lincoln Telephone & Telegraph Co. be authorized to discontinue offering grounded telephone service and four-party telephone service at the following exchanges: Adams, Cook, DeWitt, Gilead, Grafton, Guide Rock, Humboldt, Jansen, Johnson, Nemaha, Rising City, Table Rock and Talmage.

November 6: Hearing in the matter of readjustment of handset rates for the Lincoln Telephone & Telegraph Co. pending on motion of the commission.

NEW YORK.

September 30: Hearing in Buffalo before Examiner Geo. E. McVay in the commission's investigation into the rates, rules and practices of the Orange County Telephone Co., Middletown.

September 30: The Finger Lakes Telephone Corp., of Marcellus, and the Vernon Telephone Co. Inc., of Vernon, filed with the commission revisions of their tariff schedules which will waive all service connection charges between October 1 and November 30 and which will permanently reduce service connection charges from $3.50 to $2.50 for new and additional service and facilities and from $3 to $1 where service facilities are already installed. The new tariff of the Vernon company also provides that the rate for residence extensions be reduced from 75 to 50 cents.

The commission authorized the issuance of an order giving these companies special permission to file the proposed changes in their tariffs on less than statutory notice. Both companies plan to carry on a sales campaign during October and November.

OHIO.

September 24: Authority granted the Cavett Telephone Co. in Van Wert county to abandon its service November 15. The company, in asking for such authority, pointed out to the commission that it was not making any money; further, that its property was in such condition that it would have to be rebuilt if it were to continue in business, and that it was not financially situated so that it could make the necessary improvements.

September 24: Order issued dismissing the complaint of Albert Titmus, of Akron, in which he alleged that the Ohio Bell Telephone Co. was charging him an excessive rate for telephone service. It was developed at the hearing that Mr. Titmus resides in a zone area and not in a base area, and the commission ruled that he had not been discriminated against as he was not entitled to a base area rate.

September 25: Pleading that it was operating at an annual loss of $7,822.40, the Northwestern Ohio Telephone Co. filed a petition asking for authority to adopt a new rate schedule for service at Wauseon, which the company said would reduce its annual loss to $1,496.68. The new tariff proposed is: Business independent, $4.25; business two-party, $3.75; rural business, $3.25; residence independent, $4.25; residence five-party, $2.00; rural residence, $2.00. The present tariff is: Business independent, $2.75; business two-party, $5.00; business and residence, $4.00; residence independent, $1.75; two to four-party, $1.50.

October 17: Hearing to be held on petition filed by the Frazeysburg Home Telephone Co., Muskingum county, setting forth that its line, which is 2½ miles long, serves only one subscriber, Mrs. Emma Ctawner, and that it is so badly deteriorated as to necessitate rebuilding, and that such expense is not warranted by the business.

The petition further states there is no possibility of increasing the number of subscribers, and for that reason asks authority to abandon the line.

The commission has relieved the Frazeysburg Home company of the duty of publishing in a newspaper, notice of its application to the commission seeking authority to abandon the line that is serving only one subscriber.

PENNSYLVANIA.

September 14: Authority granted the Pennsylvania Telephone Corp. to issue $5,200,000 of 4 per cent first mortgage bonds, due October 15, 1950, to retire a similar amount of 5 per cent bonds.

The company proposed to sell the bonds to investment bankers at not less than 97 per cent of par, net, with the understanding that, if the bankers can sell the bonds to the public at a price in excess of three points above the price paid to the company, the excess also will revert to the company.

The company operates in Erie, Crawford, Venango, Warren, Somerset, Cambria, Indiana, Westmoreland and Bradford counties.

WISCONSIN.

October 1: Hearings resumed in the statewide investigation of Wisconsin Telephone Co. Cross-examination of company witnesses continued.